FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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Flight.

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SPECIAL NOTICE.

CHRISTMAS HOLIDAYS.—Owing to Christmas Day and Boxing Day falling on Wednesday and Thursday this year, it is necessary for FLIGHT for December 28th to close for press on December 20th. All copy, editorial or advertisement, must therefore be at the office, 44, St. Martin's Lane, not later than first post, December 20th.

EDITORIAL COMMENT.

Progress of Military Aeronautics Abroad.

The atmosphere is undoubtedly electric just now in matters pertaining to the mastery of the air, and it will be well if this country succeeds in generating the spark of effective enthusiasm ere the charge quietly condenses once more on the envelopes of Germany's dirigibles and the wings of the French avions. France herself is evidently taking unusual notice of her surroundings even in the midst of her own energies, while as to what Germany may be thinking it would be a mere waste of paper to discuss. Her work, at any rate, speaks for itself. There is so much secrecy in Germany, however, that we question very much whether those outside official circles thoroughly appreciate the progress that has been accomplished, and for this reason an article published the other day in *Le Temps* is perhaps the most interesting and informative contribution of its kind that has yet found its way into the columns of the general press. It has, at any rate, attracted very considerable attention, and we trust that it has been read and appreciated by those responsible for the maintenance of British prestige in the air. In another place we give a summary of some of the more important facts contained in the article, and we would express here a very frank acknowledgment of indebtedness to *Le Temps* for the pains they have taken to unravel the tangled skeins that have so complicated the history of the development of dirigibles in France and Germany. It has not been easy of late for anyone not constantly in touch with the various headquarters to keep track of the numerous engines of war as they pass from one place to another and change their names, as so many of them have done, on the journey.

Our contemporary's most able article was not compiled in five minutes. It would be a pity if some of those things it contains should by any chance escape notice, and at the risk of being criticised for repetition, we venture here and now to recapitulate a few of its leading points. The article opens with what may be considered as a brief statement for the prosecution in which an imaginary court was being reminded of the small part apparently played by the two French dirigibles "Dupuy de Lome" and "Adjudant Reau" attached to the red and blue armies at the recent manœuvres. The defence then proceeds to explain the situation from what purports to be the military point of view. It is just this point of view that is so very interesting, and more particularly so perhaps to our own readers, following as it does upon the articles on military aviation that have been published in FLIGHT this last week or so.

It appears that the duty of the French dirigible in war is to keep mainly in its hangar while the armies are actually in combat. Its purpose is effected in advance of the actual fighting, when it proceeds to reconnoitre the country in the line of the enemy's march and to afford facilities for the rapid preparation of detail maps and collection of other information of invaluable use to commanding officers. The utility of the dirigible in connection with work is that it has far more extensive range of action than an aeroplane, that it can carry a wireless telegraphy equipment, and so transmit information

to headquarters while it is still *en route*, that it can hover over any particular place if it is desired to observe for a considerable time, that it can carry several men and a considerable amount of explosive material, which it can discharge with precision. In addition to its reconnaissance work, therefore, it is potentially able to cause some degree of inconvenience to the advancing army, and may upon occasion serve to effect a change of plans such as may be of extreme assistance to its own general.

The efficacy of its operations depends largely on its ability to travel at night and its comparative invisibility under such circumstances. It is thus able to accomplish its journey unseen, and to be already in a point of vantage from which to make its observations when the day breaks. According to the French idea, as set forth in *Le Temps*, the dirigible is essentially a night bird in this respect. During the actual process of battle it is thought that it would be subjected to greater risks than its uses might warrant its taking.

Having, so to speak, explained the case for the dirigible the article proceeds to point with no uncertain emphasis, to the superiority of German progress in the evolution of this type of aircraft. It draws attention to the importance of speed, and points out that Germany has airships capable of achieving 43 m.p.h., whilst the speed of the French vessels is more nearly in the order of 34 m.p.h. The range of action on the part of the German dirigibles is also in the order of 800 or 900 miles, which is more than twice the distance that any aeroplane in the Military Trials could have flown on the charge of fuel that it was required to carry under the test conditions. This is not to say that aeroplanes could not fly farther, but is merely mentioned in order more clearly to emphasise the military point of view of the purpose of an aeroplane in war. An arbitrary duration was selected sufficient to cover the exigencies of ordinary reconnaissance, and yet not such as to handicap the design from realising the qualities that are most desired of an aeroplane in reconnaissance work.

As in our own case, so does *Le Temps* point the moral of the argument that the Government must allocate still more funds for aeronautical development, and as France is already spending far more money than England ever thought of voting for this purpose it may be judged that this country will soon be left further behind than ever unless it takes itself very seriously to task without delay. In summarising the relative importance of the aerial navies of the world, as represented by dirigibles, *Le Temps* says, very naturally, that the Germans are easily the most important of all. France comes second, then Russia, then Italy, and then England, after which is Austria-Hungary. It matters not what anyone may say about the relative advantages of dirigibles and aeroplanes, it is merely necessary to look at the position of England in the above mentioned sequence in order to decide that it will not do. The ultimate evolution of military aircraft must settle for itself what types are serviceable, and what are of less account; at the moment it is necessary for a great Power like England to be in the first rank of progress and to be appreciably on a footing of equality with other countries in every respect. It is only necessary to remember what General Grierson said recently about the impossibilities of successfully conducting warfare without the mastery of the air. That England depends for her security on the mastery of the sea detracts in no way from the importance of a soldier's opinion of the significance of aerial craft in the preparation for and conduct of a battle. In any case it behoves Great Britain to find out for herself all there is to know about dirigibles and aeroplanes, and any other kind of aircraft that may be shown to be worthy of consideration. In order to do this, it is essential that there should be adequate funds for the purpose.

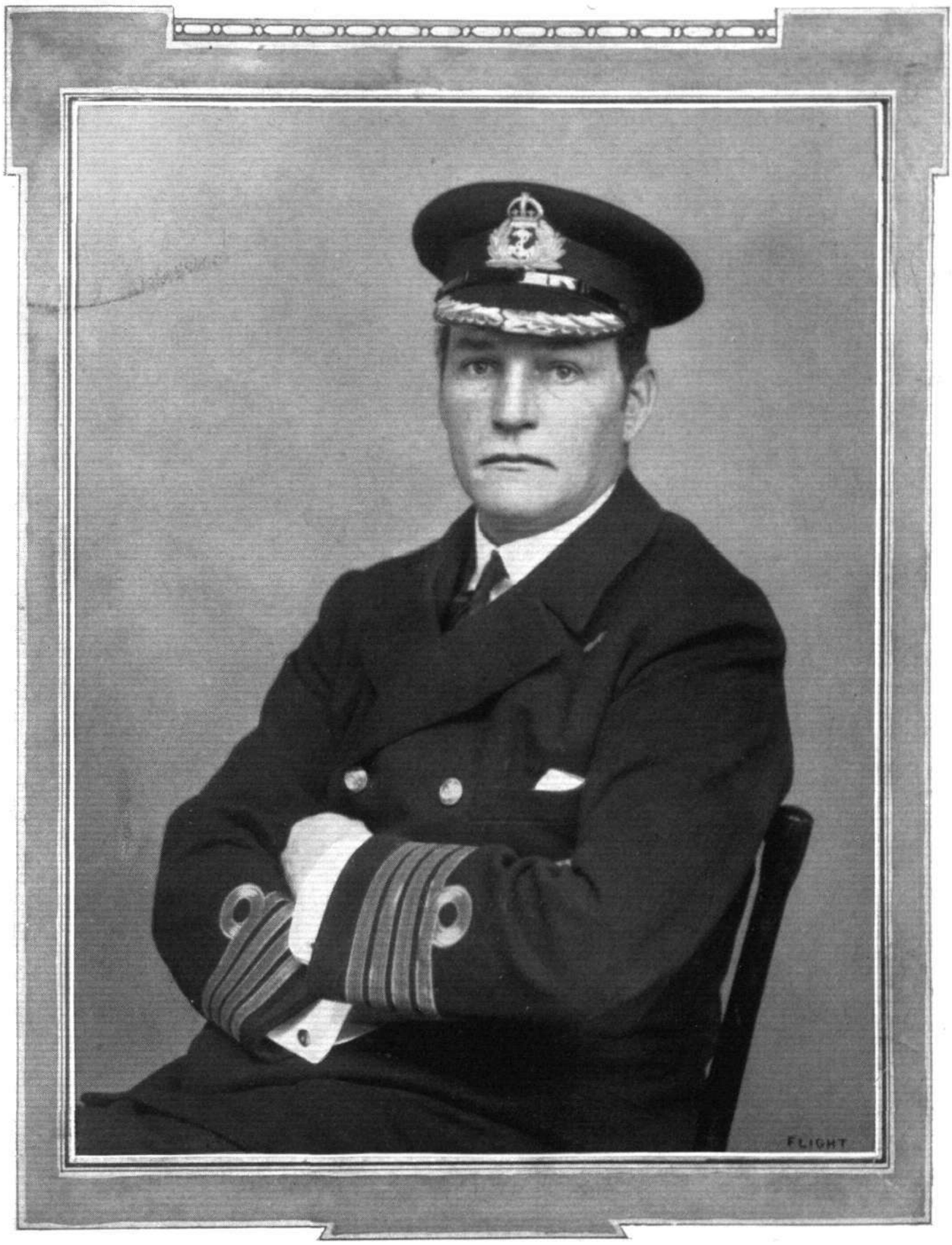
In order to emphasise the systematic way in which Germany has pursued the development of her aerial fleet, *Le Temps* recapitulates the disposition of the German military airship stations, of which we have prepared a little diagramatic map that appears elsewhere. Six of these stations are situated on the French frontier at Duisburg, Dusseldorf, Cologne, Frankfort, where there are two, and Friedrichshafen. One is against the Russian frontier at Koenigsberg, one on the coast at Altona, near Hamburg, which is to serve the fleet, and three inland, of which two are at Berlin and one at Bitterfeld.

A point of which *Le Temps* makes much, and it is obviously of first-class importance, is that the Germans have made excellent provision for the manufacture of pure hydrogen in quantity, and all their military stations are equipped with suitable plant. The new shed constructed at Frankfort for the "Victoria-Louise," one of the Zeppelins, is supplied with hydrogen from the Griesheim works through a conduit more than two and a half miles long. This pipe line, which is the first of its kind developed, has a capacity of 1,000 cubic metres of hydrogen per day, the gas being delivered under high pressure to a reservoir of 6,000 cubic metres capacity. Provision is also made for simultaneously inflating each of the eighteen interior balloons, of which the gas vessel of the Zeppelin airship is composed.

It suffices, as *Le Temps* remarks, merely to cast one's eye on a map of Germany to appreciate the remarkable developments that have already taken place in connection with the use and manufacture of dirigibles. Adding private sheds to those exclusively military, there are some twenty-five different hangars massed for the most part on the French frontier. As to the airship factories, if France has four in the works of Astra, Clement-Bayard, Lebaudy and Zodiac, Germany, on the other hand, possesses five —at Munich, Friedrichshafen, Mannheim, Berlin, and Bitterfeld, "which are much more important than ours."

Speaking of the relative magnitude of the aeroplane developments in the two countries, *Le Temps* takes heart at the thought that France, at any rate, plays a leading *rôle* in this field, but points a finger of warning towards the work that Germany is doing with aeroplanes equipped with guns. French flying machines are said to have a superior range of action because they have better engines and on the whole that they are better flown. On the other hand, it appears that German opinion consoles itself that the function of the aeroplane in war will not demand these qualities to the same extent as is apparently supposed to be necessary in France. It is doubtless a case of making the point of view fit the existing conditions, for according to the account it would seem that there is some difficulty in recruiting aeroplane pilots, and that the majority come either from Poland, Alsace, or the Tyrol. It is very difficult of course to obtain any exact information as to what is going on in Germany. The Press is forbidden to report journeys made by military officers, and the list of military pilots is, as far as possible, kept secret. The same secrecy prevails as to the practice on the flying ground of Doeberitz near Berlin, which is almost exclusively reserved for military use, and very seldom are even the constructors allowed to pass into the flying-ground proper.

MEN OF MOMENT IN THE WORLD OF FLIGHT.



Capt. G. M. PAINE, M.V.O., R.N., Commandant Central Flying School, Upavon, Salisbury Plain.

DIRIGIBLES IN GERMANY AND FRANCE.

IN a leading article this week, we deal with a most valuable and interesting article recently published by our French contemporary, *Le Temps*, which contains, in addition to an amount of very instructive comment, the following summarised statistics relating to the dirigibles in Germany and France. The following is a list of the airship sheds in the two countries, including those owned privately in addition to those that belong to the Government, and on page 1162 are details of the various aircraft:—

Germany.

Military sheds.

Strasburg	1
Metz	1
Cologne	1
Koenigsberg	1
Reininckdorfen, p. Berlin	3
	7

In construction.

Wilhelmshaven (for the Navy).
Breslau.

Private sheds.

Friedrichshafen	2
Vos (Baden-Baden)	1
Mannheim	1
Frankfort	1
Dusseldo f	1
Wanne	1
Munich	1
Gotha	1
Hambourg	2
Kiel	1
Bitterfield	2
Reininckendorf (Berlin)	1
Bresdorf (Berlin)	1
Potsdam	1
Johannisthal	2
	19

Total: 26 sheds available.

France.

Military sheds.

Maubeuge	1
Verdun	2
Toul	1
Epinal	1
Belfort	1
Reims	1
	7

Private sheds.

Issy-l.-Moulineaux	2
Saint Cyr	2
Mousson	1
Lamotte-Breuil	1
Rheims	1
Chalons-s.-Marne	1
Meaux	1
Melun	1
	10

Under construction for the National Aviation Committee, about ... 32

Total: 17 sheds available.

The following is a list of the airships available in Germany and France:—

Military Airships.

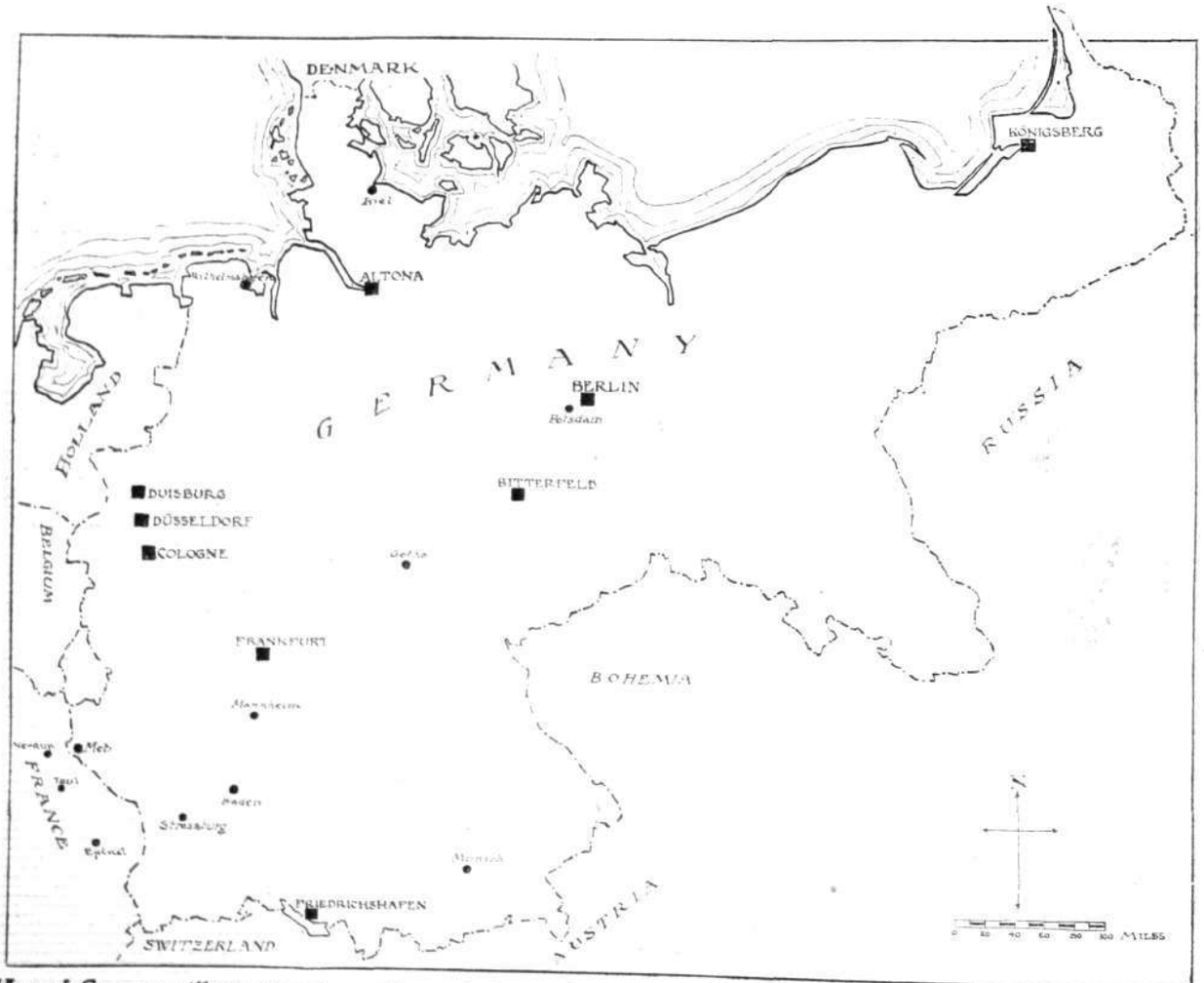
Germany.		France.	
In service	9	In service	8
On trial	0	On trial	4
In construction	6	In construction	4
Doubtful	5	Doubtful	2
Total	20	Total	18

Other Airships.

In service	7	In service	0
On trial	0	On trial	0
In construction	3	In construction	1
Doubtful	5	Doubtful	4
Total	15	Total	5

Summary of Airships available for Mobilisation.

Germany.		France.	
Ready	16	Ready	8
On trial	0	On trial	4
In construction	9	In construction	5
Doubtful	10	Doubtful	6
Total	35	Total	23



Map of Germany illustrating the positions of the airship stations. Those indicated by a large square dot are the principal military stations, as given in an article that we quote from *Le Temps*. The names in smaller type are supplementary centres of private activity.

GERMANY'S DIRIGIBLE FLEET.—One of the latest additions, the Hansa, as seen looking towards the bow of the airship.

FRENCH DIRIGIBLES. (See pages 1157–1160.)

Military.

Name.	Year	Factory.	Capacity.	Engine. No.	h.p.	Speed.	Make.	Station.	Remarks.
			cubic metres			k.p.h.			
Fleurus	1912	Chalais-Meudon...	6500	2	80	58	Clement-Bayard...	Saint Cyr	
Colonel-Renard ..	1910	Astra	4200	1	100	50	Panhard	Issy	For practice.
Liberte	1909	Lebaudy	4800	1	120	45	Panhard	Chalais-Meudon ...	
Capitaine-Marchal...	1911	Lebaudy	7500	2	75	48	Panhard	Châlons	
Adjudant Vincenot...	1911	Clement-Bayard...	9000	2	100	54	Clement-Bayard..	Verdun	
Le Temps	1911	Zodiac	2500	1	70	—	Laviator	—	Obtained by subscription from readers of *Le Temps*.
Dupuy-de-Lome ...	1912	Clement-Bayard...	9000	2	125	54	Clement-Bayard .	Maubeuge	
Selle-de-Beauchamp	1911	Lebaudy	8000	2	75	50	Panhard	Moisson	To be transferred to Maubeuge.
Adjudant-Reau ...	1911	Astra	8950	2	120	53	Brasier	Verdun	
Lieutenant-Chaure...	1911	Astra	8950	2	120	53	Panhard	Issy-les-Moulineaux	Subscribed by readers of *Le Temps*.
Eclaireur-Conte ...	1912	Astra	6640	2	75	46	Chenu	—	On trial.
Capitaine-Ferber ..	1911	Zodiac	6600	2	90	54	Laviator	Epinal	
Commandant-Coutelle	1911	Zodiac	9000	2	190	—	Laviator	—	Taking delivery.
Spiess-Rigid ...	1912	Zodiac	11000	2	200	—	Chenu	—	Trials pending.

Private.

Clement-Bayard VI	—	Clement-Bayard...	6200	2	90	58	Clement-Bayard...	—	In construction.
Astra-I	1908	Astra	4475	1	100	43	Clement	—	Belonging to Compagnie Transaérienne.
Astra-Torres ...	1911	Astra	1600	1	55	56	Chenu	—	Belonging to Société Astra.
Croiseur-Transaerien	1912	Astra	9000	2	150	56	Chenu	—	Belonging to Compagnie Transaérienne.
Zodiac III	1909	Zodiac	1600	1	40	—	Ballot	—	Belonging to Société Zodiac.

Under Construction or Re-construction.

A	—	Astra	17000	—	1000	70	—	—	Ordered under the budget of 5,000,000 frs. for 1913.
B	—	Clement-Bayard...	17000	—	1000	70	—	—	
C	—	Lebaudy	17000	—	1000	70	—	—	
D	—	Zodiac	17000	—	1000	70	—	—	
X	—	—	17000	—	1000	70	—	—	Will be ordered after the trials of A, B, C and D.

GERMAN DIRIGIBLES.

Military.

Z–I	1906	Zeppelin	12000	2	85	58	—	Metz	
Z–II...	1911	Zeppelin	12000	2	100	57	—	Cologne	
Z–III	1912	Zeppelin	12000	3	100	72	—	Metz	
M–I...	1908	Gross	5200	2	75	45	—	Metz	
M–II	1909	Gross	5200	2	75	46	—	Cologne	
P–I	1908	Parseval	4000	1	115	47	—	Metz	
P–II	—	Parseval	4000	1	100	47	—	Cologne ...	
P–III	1911	Parseval	10000	2	160	60	—	Koenigsberg ..	
Siemens-Schuckert	—	Siemens-Schuckert	13000	4	120	71	—	—	
LI	—	Zeppelin	22000	3	145	75	—	Johannisthal ...	For the navy. Formerly L–Z–14.

Private.

Hansa	—	Zeppelin	19000	3	145	75	—	—	
Victoria-Louise ...	—	Zeppelin	19000	3	145	75	—	—	
Schutte-Lanz ...	—	Schutte	20000	2	270	75	—	Mannheim	
P.L–I	—	Parseval	3200	1	—	—	—	—	
Stolewerck	—	Parseval	7500	2	110	—	—	Johannisthal ...	Formerly P.L–6.
P.L–9	—	Parseval	1800	1	50	28	—	Soc. Aerienne ...	
Ruthenberg ...	—	Ruthenberg ...	1200	1	24	—	—	Hambourg	
Clouth	—	Clouth	2000	1	48	36	—	Cologne	
Suchard	—	—	12000	2	110	—	—	Hambourg ...	Deflated.
Weeh	—	Weeh ...	6780	2	180	—	—	Munich ...	Deflated.
Gans Fabrice ...	—	—	—	—	—	—	—	—	Doubtful.
Steffen	—	—	500	—	—	—	—	Keil	

Under Construction or Re-construction.

L.2–15	—	Zeppelin	19000	3	145	—	—	Soc. Delag	
P.L–10	—	Parseval	1800	1	—	—	—	Soc. Aerienne ...	
P.L–12	—	Parseval	8000	2	110	—	—	—	
P.L–14	—	Parseval	10000	2	200	—	—	—	
P.L–15	—	Parseval	6700	2	110	—	—	—	For the German army.
Weeh–2	—	—	8000	2	150	—	—	—	For the Italian army.
P.L–16	—	Parseval	10000	2	200	—	—	—	
P.L–17	—	Parseval	10000	2	200	—	—	—	
P.L–18	—	Parseval	10000	2	200	—	—	—	
P.L–19	—	Parseval	10000	2	200	—	—	—	
M–4	—	Gross	5200	2	100	—	—	—	Modified design, nearly ready.
M–5...	—	Gross	5200	2	100	—	—	—	Modified design, nearly ready.
M–6...	—	Gross	5200	2	100	—	—	—	Modified design, nearly ready.

FLYING AT HENDON.

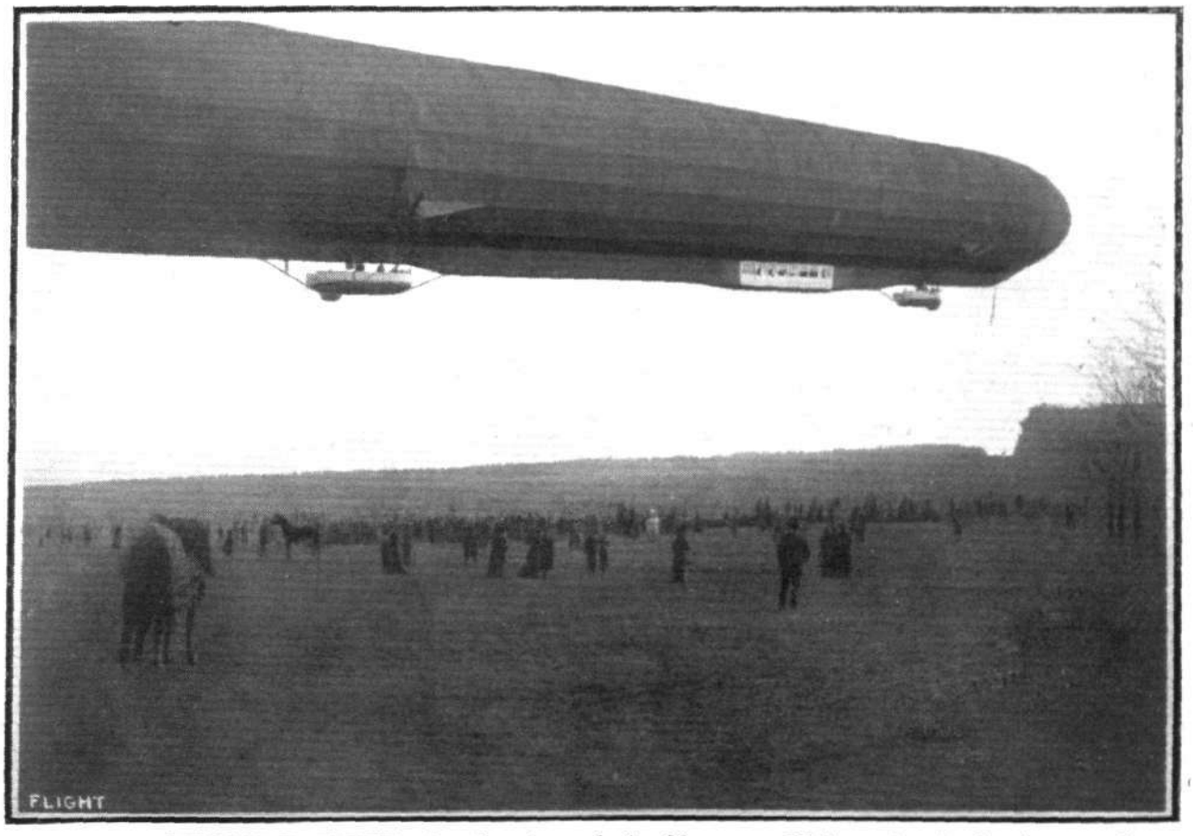
LIKE Charley's Aunt, the week-end meetings at Hendon are still running, even though the "houses" are perhaps not quite so well filled now as on previous occasions. On Saturday last the weather was decidedly dull; there was a gusty wind and the clouds were lying very low. The first event of the day was the usual week-end Brooklands' trip, with a passenger, of the Handley Page monoplane. This time the journey was made from Brooklands to Hendon, as the monoplane had not returned home after its eventful journey the week before. Owing to the mist, which at times completely obscured the view of the ground, it was most difficult to keep a straight course, in fact—as Mr. Handley Page put it—the journey was made up of a series of "figure eights." They managed to find Hendon, however, and landed quite safely about 18 minutes after they left Brooklands. No flights were made in the afternoon with this machine, as some repairs had to be made to the tail skid.

At about 3 o'clock Louis Noel went out on the 80-h.p. Henry Farman biplane, and flew over the surrounding country. Just before he landed, Marcel Desoutter ascended on the 50-h.p. Gnome-Blériot, and remained aloft for about 11 mins. One could see by the way the machine rocked about that the wind was far from pleasant. While Desoutter was still up, M. D. Manton put up a seven-minute flight on the 50-h.p. Grahame-White 'bus, finishing up with a very good landing—about half-a-minute after Desoutter. Without stopping the engine, Manton changed places with R. T. Gates, who made a short flight across the ground and back. In the meanwhile Sydney Pickles got away on the 35-h.p. Anzani-Caudron biplane, the little machine climbing in a wonderful manner. Noel then took up a passenger on the 80-h.p. Farman, making a flight of about 4 mins. Sydney Pickles landed immediately after Noel, having been up for 10 mins., and as he landed Manton again went up on the Grahame-White 'bus. He was up for about 12 mins., reaching a height well above 500 ft. At times, when against the wind, the biplane appeared to make but little progress, and would then shoot forward a little, showing the gusty nature of the wind. So nasty was it, in fact, that Mrs. Stocks, who in the meantime had climbed into Desoutter's Blériot, very wisely decided—after a short flight across the ground—to remain below.

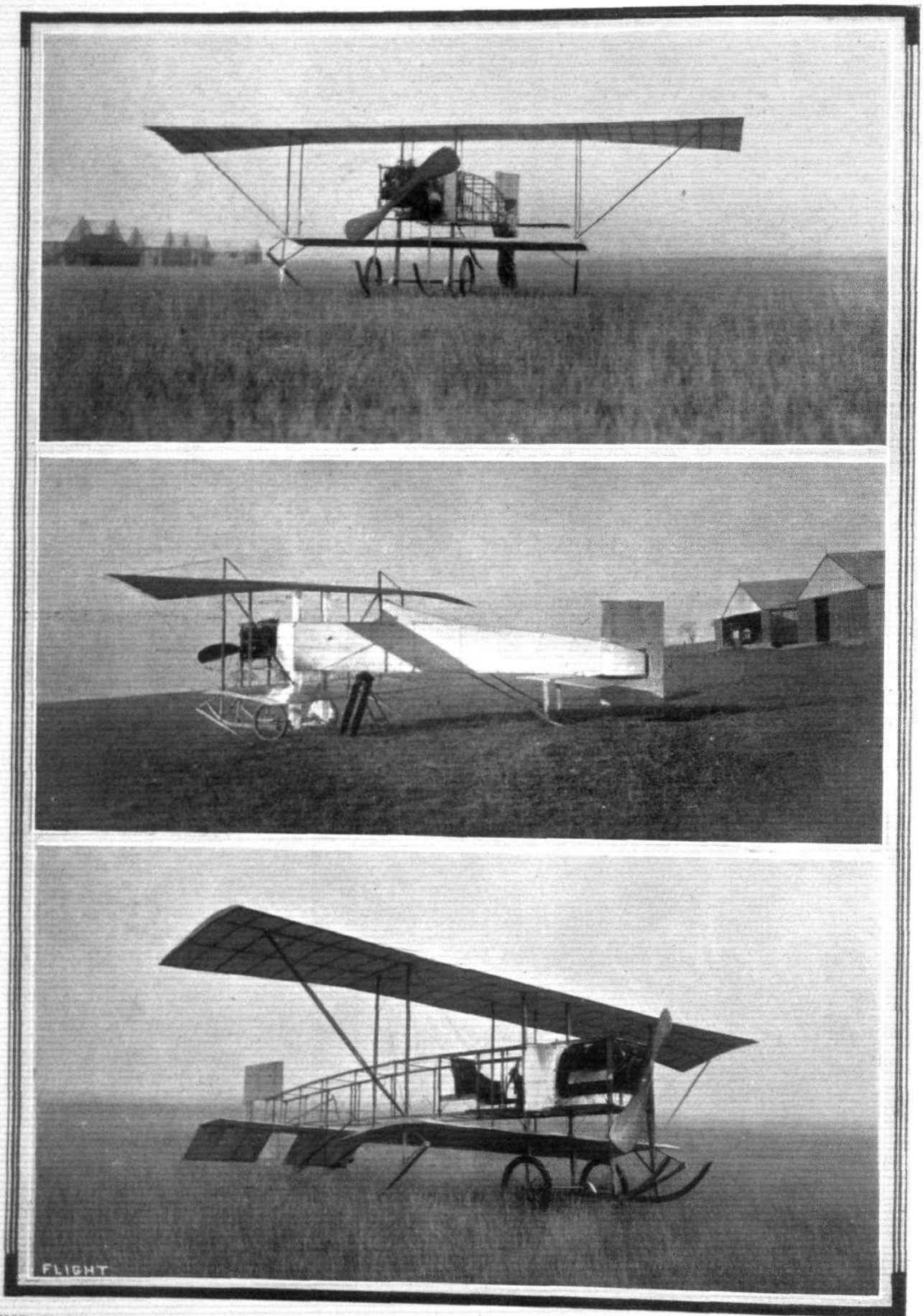
Shortly before 4 o'clock three machines ascended one after the other, the 80-h.p. Henry Farman with Noel and a passenger up; the 35-h.p. Caudron biplane piloted by Sydney Pickles, and the Blériot with Desoutter in charge. Noel and Desoutter remained up for about five or six minutes each, but Sydney Pickles was going for nearly 15 minutes, climbing nearly all the time. A few minutes before he landed, Noel was up again in the "eighty" with a passenger, after which Manton wound up the proceedings of the day with a four-minute flight on the 'bus. Altogether, just a dozen flights were made during the afternoon.

Another dozen flights were got through the following Sunday afternoon, which, in the early part, was inclined to be rather showery. The first two flights were made by the Handley Page monoplane, the former of these being made in the rain. A passenger was carried each time, and two other passenger flights were made later in the afternoon. One of the passengers taken up was A. J. Plant, the St. Peter of the Aerodrome, who, after having *seen* many hundreds of flights, was given his first impression of what it feels like to *make* one. Manton made two flights on the Grahame-White 'bus, as did R. T. Gates. Manton—who, by-the-way, has wisely invested in a Warren helmet—finished up his first flight with a very good spiral *vol plané*. Louis Noel made three semi-cross-country flights on the 80 h.p. Henry Farman, the first by himself, and the second and third with a passenger. The writer was fortunate enough to be the latter passenger and particularly noticed how puffy it was at about 100 ft. from the ground, whereas at above 600 ft. the biplane was quite steady. It was just twilight when this flight was made, and it was an extremely fascinating sight to observe twinkling lights appearing in the diminutive houses below.

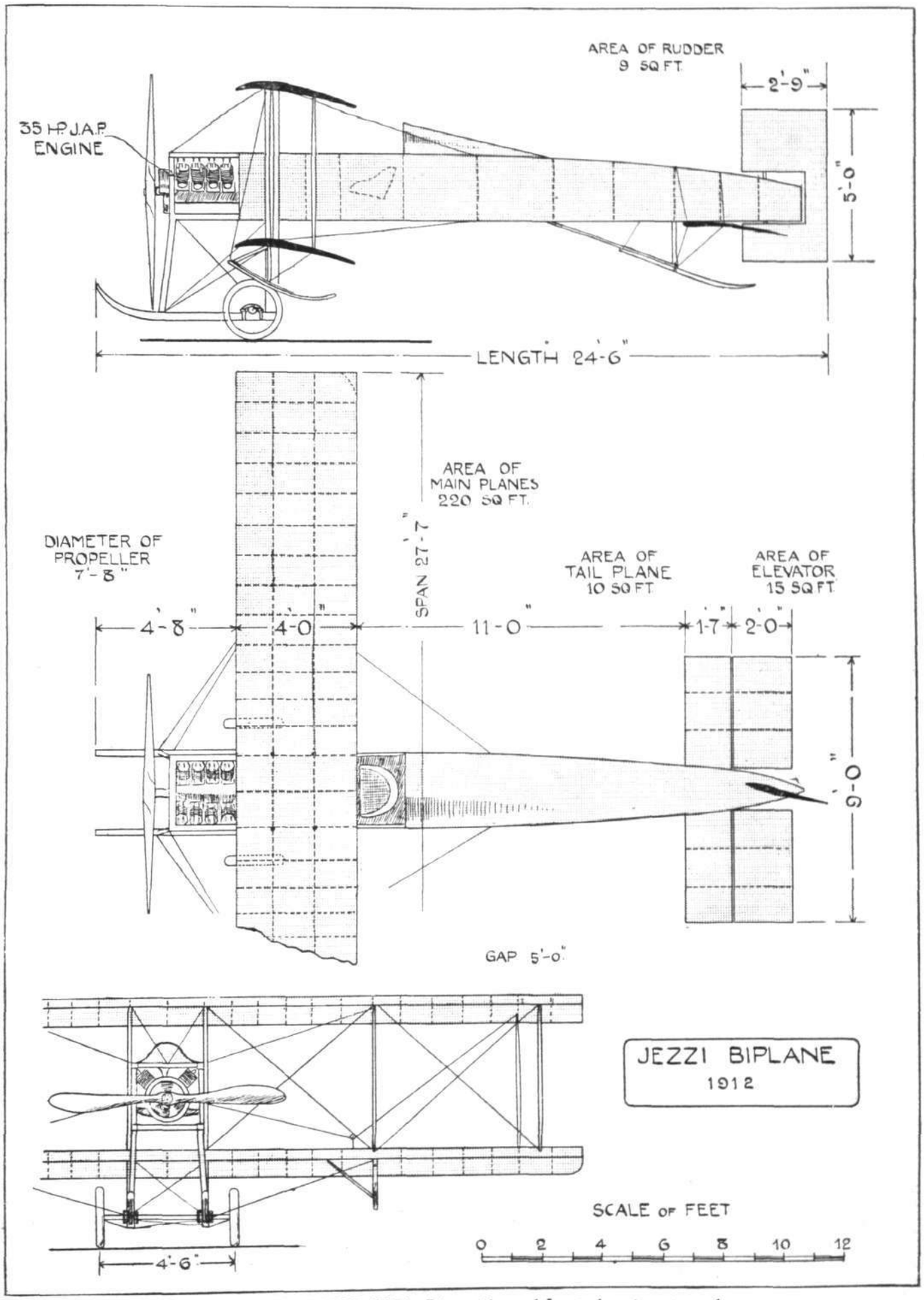
Marcel Desoutter experienced a new—to him—sensation during the afternoon; while making a flight on the Blériot, he passed right beyond the clouds into—brilliant sunshine! He was, he said, very struck with the action of the wind and picturesque effect of the bank of clouds below him.



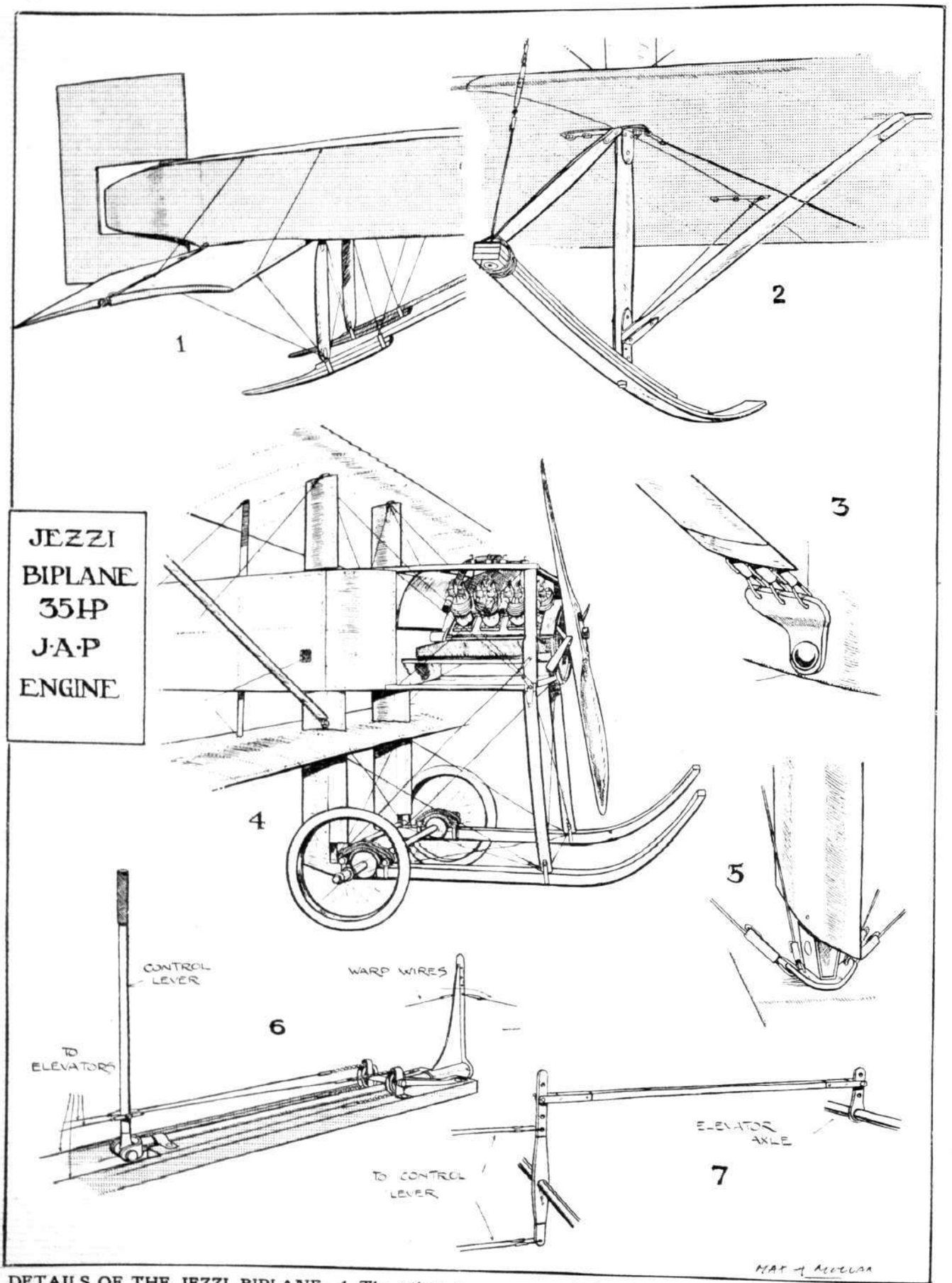
GERMANY'S DIRIGIBLE FLEET.—A side view of the Hansa at Halberstadt, clearly showing the two cars, and, towards the further end, the big passenger saloon which is capable of accommodating some thirty occupants.



THE JEZZI BIPLANE.—The top and bottom photographs of the above set of three were taken in the early part of this present year. The central photograph was obtained a month or two later when the body had been covered in with fabric, and king posts and wire bracing arranged to support the top plane extensions in place of the compression struts that were originally used. Within the last fortnight extensions have been fitted to the lower plane as well, bringing it to the same span as the top one.



THE JEZZI BIPLANE.—Plan, side, and front elevations to scale.



DETAILS OF THE JEZZI BIPLANE.—1. The tail; it is so constructed that the levers operating the rudder and the elevators may be arranged inside, so saving wind resistance. 2. The laminated wing skid. 3. The attachment to the *fuselage* of the wires that take the main lift; they are of ten-gauge material, and it will be noticed that they are carefully enclosed in a stream-line casing of aluminium. 4. General sketch of the front of the machine. 5. One of the strut attachments. 6. Sketch showing the arrangement of the elevator and warping control. 7. Detail of the control, showing how adjustment of the elevator is effected.

FLIGHT

A VISIT TO THE JEZZI CAMP AT EASTCHURCH.

IT was horribly cold and wet and, taking it all round, an unusually miserable prospect when I rolled out of my bed at half-past seven in the morning. Even getting that far was something of an accomplishment, I thought. There did not seem much use in going down to Eastchurch that day. Eastchurch, with its perfectly wonderful train service, is quite a sufficient handful on a fine, warm day. But it was no use meditating on things in general, for an appointment is an appointment whatever the weather may be like. And so it was that three shivering mortals—I had been, meantime, joined by two of my colleagues—turned out of the lethargic little train that occasionally runs from one end of Sheppey Island to the other, and made their way as cheerfully as the weather conditions would permit towards the flying ground.

Everything was shut down and not a soul was in sight, as might have been expected. A buzz from Messrs. Short, Bros.' works, however, told that there was plenty going on inside.

We found Mr. Jezzi quite alone in overalls, with a scarf round his neck and carpet slippers on his feet, busy in his shed. He was hard at it, fitting wind deflectors between the two V-set rows of cylinders of his J.A.P. engine so that it would keep cooler when running. And perhaps the old motor deserves it, for it has seen Mr. Jezzi through a hard two years of experimenting. It was formerly fitted to Mr. Jezzi's first machine, a biplane somewhat similar to a Wright machine, but driven by two tractors in front, which were supplemented to some extent in their efforts by a third, a miniature one in front of the motor, whose main duty was to keep the engine cool.

The machine did a lot of flying in its time before it was scrapped to give place to the interesting little machine that Mr. Jezzi has been experimenting with for the past nine months. On it, the old machine, Mr. Jezzi passed the tests for his pilot's certificate, and his friend, Mr. Arthur Cooper, who has cycled down to Eastchurch most week ends, lending invaluable help during the whole time Mr. Jezzi has been there, would have done so, too, for he used to handle the machine extremely well in the air, had it not been for a series of minor mishaps.

The present machine is a most attractive-looking miniature biplane. It was built in its entirety by Mr. Jezzi himself in a workshop adjoining his private house, south of London. That he should have been able to complete it at all is rather a wonder, for a city man has not, as a rule, much time to devote to a hobby. But notwithstanding strenuous days in the city, Mr. Jezzi has put in equally strenuous evenings, and more often nights, in his workshop following out his fascination for aviation. Week-ends and business holidays are the only periods when he can get away to his shed at Eastchurch. I recall that I felt rather a hero rolling out of my bed at 7.30 a.m. This impression collapsed somewhat when it came out in the course of conversation that Mr. Jezzi had turned out, in pitch darkness, before six that day, and had come down all the way by road on his 2¾-h.p. Douglas—and on such a morning!

But it is not often that business will allow him to get down to Eastchurch so early. It is usually after lunch time that he arrives at his shed. About 10 feet of one side of his hangar is partitioned off into a living and two sleeping rooms, and these are invariably inhabited by Mr. Jezzi and his friends from Saturday midday till Sunday night; then it is a case of getting back to town in readiness for business next day. Thus work proceeds and has proceeded for the past two years.

And the outcome? Amongst many things, a tremendous fund of constructional and flying experience, a constitution hardened and made perfectly fit as the result of the open-air life that practical experimenting such as this offers—and an extremely promising biplane. And so we gather round the machine, admiring its many neat points. Meanwhile, Mr. Jezzi returns to his work on the motor. At last the wind deflectors are fitted, and he proceeds to test the engine. Shutters at the end of the shed behind the machine are taken down—otherwise they might be blown down by the propeller slip-stream as soon as the engine is started. A Navy man pulls over the propeller and the motor roars into its note. The place gets full of blue smoke, and with the draught we all get well nigh frozen.

It was with some amount of satisfaction, therefore, that we heard the cry of "Tea's ready!" coming from the little living room.

Inside there was a small stove packed to its uttermost capacity with white hot coke. The effect on our spirits was remarkable. The blinds were drawn across the windows, and the four oil lamps were made to shed a comfortable light on the scene.

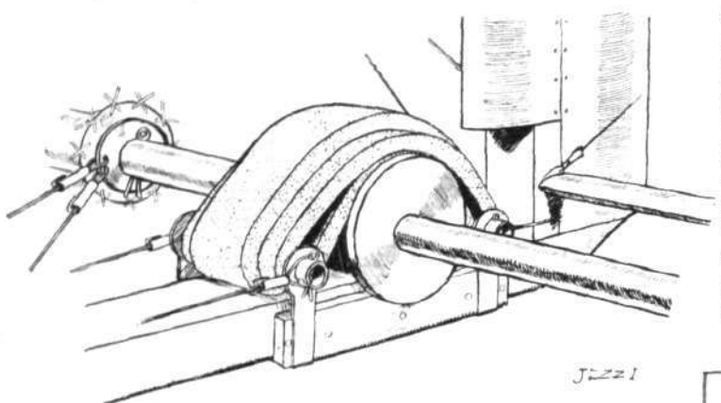
There were two sheets of newspaper on the table for a tablecloth, and on it were arranged enamel cups, and knives and teaspoons enough for a party of five, for Mr. Arthur Cooper had by then arrived, bringing with him his contribution towards the "stores"—two big loaves of bread and a pound of butter. In addition, Mr. Jezzi had produced from his larder—a propeller box nailed to the wall—liberal supplies of lovely preserved ginger and jam.

The attractive Jezzi biplane in flight—a photograph secured some two months since, before the extensions were added to the lower planes.

Let us draw the curtain over the picture of a party, exhibiting enormous appetites, rapidly becoming cheery under the comforting influence of honest bread, butter and jam and steaming tea, for it is all in a day's march when you are learning the gentle art of aviation.

The Machine.

The present Jezzi biplane is a machine that has been designed to fly at a high speed with comparatively little



Details of the Jezzi landing gear.

power. The biplane's normal speed with the motor pulling moderately well is about 65 m.p.h., which is no mean achievement with an engine power of 35-h.p., especially as the machine's capabilities do not alone lie along the line of speed. It is a common occurrence for Mr. Jezzi to take a passenger of 12 stone for a trip round the ground, while on one occasion he actually flew with a 16 stone passenger, although on this occasion the heavy load did make the machine drag its tail somewhat.

To obtain this efficiency Mr. Jezzi has endeavoured to cut away as much head resistance as is possible. There we find that there is only one rank of struts—carefully stream-lined ones at that—between the planes, and that there are few cross bracing cables. The body of the machine, too, is covered in throughout its whole length with fabric, and is sufficiently wide against the tail to allow of the levers operating the rudder and elevators to be disposed inside.

The planes were, until quite recently, of 28 ft. and 14 ft., span respectively for the upper and lower spreads. Just lately, however, extensions have been fitted to the lower plane to bring it to the same span as the upper surface. Their maximum camber is relatively small, just $1\frac{1}{2}$ ins., their maximum thickness 2 ins., and their incidence to the relative wind in flight from 4° to 5°.

In the construction of the machine ordinary but particularly clean spruce has been made use of almost exclusively. Indeed, the only other wood that is used, and the only section of the machine in which it appears, is English ash for the landing skids. For the landing gear our sketches show its chief characteristics, and little need be said, except that it is very solidly built and has given no trouble whatsoever, although it has had to take landings in some of the roughest parts of the Eastchurch ground. The control of the biplane is, perhaps, the simplest system that is in use at the present day. It had a vertical lever, universally jointed, which controls the elevators and the wing warping, and a pivoted foot bar that operates the rudder.

The machine and its constructor, Mr. Leo Jezzi.

AIRSHIP NEWS.

Good Work with "Dupuy de Lome."

FROM its station at Lamotte-Breuil the Clement-Bayard airship "Dupuy de Lome," on the 4th inst., made a trip of an hour and 50 minutes and landed at Maubeuge. On the previous day, with nine persons on board, she was cruising for nearly an hour over Compiegne.

A Day's Voyage by "L 1."

THE Zeppelin dirigible "L 1," belonging to the German Navy, put in a good day's work on the 5th inst. With seventeen officers on board, the airship started from Johannisthal at a quarter past ten, and after cruising over Lake Muggel for a long time descended to the surface of the lake. In the afternoon, the airship cruised over Berlin and Potsdam, and returned to Johannisthal at 4 o'clock.

"Schutte Lanz" Makes a Long Voyage.

AT midday on Saturday last the big Schutte Lanz airship passed over Berlin and an hour later was safely docked at Biesdorf. This marked the conclusion of a voyage which had lasted 16 hours, the airship having cruised right through the night with a party of a dozen on board, including a German army officer representing the Minister of War.

An Airship Station at Brunswick.

THE good people of Brunswick are looking forward to having a Zeppelin airship stationed among them before very long. They have offered to build an airship garage to conform with the requirements of the Minister of War.

Another Zeppelin for the German Army.

THE Zeppelin excursion airship, "Sachsen," which is now under construction, and should be ready for her trials next February, has been taken over by the military authorities, and alterations are to be made so as to render her fit for military purposes. The cabins, which are intended for passengers, are now being transformed into bomb stores, whilst wireless telegraphy stations, and platforms for quick-firing guns are being arranged for.

New Zeppelin for German Navy.

THE work of constructing a second Zeppelin for the German Navy is being pushed forward as much as possible, and in connection with it, a long series of tests, with a view to finding the best type of bomb and the most satisfactory method of dropping them, is being arranged. The new vessel will be superior in armament to the present Naval Zeppelin to the extent of at least two quick-firing guns.

More Airship Manœuvres in Germany.

THE repairs to the "Z II" having been completed, as well as the reconstruction of "P II," it is proposed to hold another series of airship manœuvres at Cologne at the end of this month. The "M 1" may also take part, so that the three types of dirigibles may be tested.

FLIGHT

AIRCRAFT IN WARFARE.

A CHAT WITH MR. H. BARBER.

SEEING that Mr. H. Barber, the well-known consultant on matters aeronautic, has not long returned from the theatre of war at Turkey, FLIGHT has taken the opportunity of persuading him to recount some of his experiences and opinions to one of our representatives.

It was rather late in the evening, our contributor writes, when I called on Mr. Barber at his cosily furnished consulting chambers at 59, Pall Mall, some few days since, to glean points concerning his recent trip to Turkey. "I went," Mr. Barber explained, "just to see what there was to be seen and learn what there was to be learned."

It occurred to me that this seems to have been one of the traits of Mr. Barber's character, for all round the room was evidence of sport and travel in all parts of the world. Above the door was an alligator that Mr. Barber clubbed in Mexico, on the wall behind were a set of photographs of his ranch in Australia, which he has owned for some fifteen years, and in front some views of Honolulu, where, Mr. Barber assured me, he had spent many pleasant months. Under his drawing-desk were a number of bulky packages that had just come back from Constantinople, containing curios—altogether a hundredweight and a half of them.

Soon after he arrived in the East, Mr. Barber said, he had the honour of being presented to and having half an hour's conversation with the Grand Vizier Kiamil Pasha at the Sublime Porte. Entering, Mr. Barber found Kiamil Pasha, quite an old man, but extraordinarily active for his age, sitting behind a desk. He waited for Mr. Barber and his friend to salute, then, rising, returned the salute and, over coffee and cigarettes, discussed the events of the day.

"By the way," Mr. Barber mentioned, "the Turkish form of salute is one of the most beautiful in the world, especially when one sees it carried out in the graceful and inimitable manner of the Turk. First you extend your hand towards the ground to signify 'I am as the dust beneath your feet,' then you touch your heart to signify 'My heart has affection for you,' then the lips, as much as to say 'I speak well of you,' and then the forehead, meaning "I think well of you.'"

It was not until the end of the interview that the conversation turned towards aeroplanes. Mr. Barber had learned that the Turkish military air service was not in a particularly well organised condition. The machines had arrived, but unfortunately they had become somewhat damaged and out there there seemed to be no one who could repair them correctly. As a result of his conversation with Kiamil Pasha, the Grand Vizier rang for his secretary and directed a letter to be drafted to the Minister of War recommending him to place the military aeroplanes under Mr. Barber's supervision. Having obtained that assurance, Mr. Barber proceeded to the scene of action, the Tchatalja lines. Here he found the aeroplanes in charge of two young Turkish officers, and one French pilot, and was largely instrumental in getting them into flying order. Mr. Barber passes it as his opinion that if either side had possessed an efficient fleet of aeroplanes and a dirigible or two for night work, the results of the conflict might very likely have been totally different. For instance, if the Bulgarians had possessed a dirigible, nothing could have prevented them from flying over Constantinople by night and seriously disorganising the military service there. They could easily have dropped bombs on to the War Office building, for it is a large structure and particularly simple to recognise from above on account of its being surrounded by its own grounds. On the other hand, if the Turks had possessed such a machine, they could have wrought considerable havoc amongst the organisation of the opposing force.

As an instance of the importance of the aeroplane in war, reports came to hand one day that Derkos, at the eastern end of the Tchatalja lines, had fallen. Immediately, the French pilot was sent off on his monoplane. He flew along the lines, circled over Derkos, and came back and reported that far from Derkos having fallen, the Turks had actually forced the Bulgarians to retreat. This important knowledge was in the hands of the Chief of Staff fifty minutes after the monoplane had been sent off.

The weather throughout the whole of the time Mr. Barber was there was just perfect for flying. There was no wind, and the sun, it being autumn, was not sufficiently strong to cause heat eddies.

"You might put down," Mr. Barber mentioned, "that the two young Turkish officers out there asked me to remember them to Mr. Collyns Pizey and the other members of the Bristol staff at Salisbury Plain whom they met when they were undergoing tuition at that school."

The observation of aeroplanes under actual war conditions will undoubtedly be of great value to Mr. Barber, for, as far as I can trace, he is the only practical designer of aeroplanes who has had such an experience. He has been in a position to see exactly what is required of a war machine, and, as he told me, his opinions as to what constitutes the best design for such a machine have been considerably modified. Efficiency, he says, in many cases will have in some measure to give way to other more practical considerations.

Talking about the scenes in Constantinople, Mr. Barber passed the comment that it was a pity some newspaper reporters sent home accounts of the disorder that was going on. Personally he noticed nothing of the kind. People crowded along the thoroughfares and assembled in cafes and music halls, and generally pursued their ordinary everyday occupations in a calm manner, although the booming of the guns could be heard all day long from the front twenty-five miles away. The most remarkable spectacle, in his opinion, next to the horrors of the cholera camps at San Stefano and Hadem Keui, was the seemingly never-ending procession of refugee peasants coming into Constantinople from the north. They came, roughly about two hundred thousand of them, with their wives and children, their bullock carts and cattle. They, almost to a man, were of exceedingly fine physique and were clothed in the bright coloured costumes that have been in vogue amongst them for the last five hundred years. It was the exodus of a nation. Those who arrived early trooped through Constantinople and camped on the quays waiting for boats to take them across into Asia. Those who came on afterwards had to camp out in the streets. They had arrived in many cases without means of support, and the funds which had been raised in London and are being administered in Constantinople by Lady Lowther, Lady Woods, Lady Crawford, and others, were of the utmost assistance in satisfying the needs of these

poor people. "No one need regret," said Mr. Barber, "having subscribed to these funds, for every penny is being spent, and well spent, for the relief of their sufferings."

So, having remained there ten days, spending almost every day on the scene of battle and in collecting information that will be of inestimable value from an aeronautical point of view, Mr. Barber returned to London to resume his work here.

In the aeronautical world, Mr. Barber occupies a somewhat unique position as the only consulting aeronautical engineer who has had practical experience in both designing, building, and piloting aeroplanes. In his consulting capacity he has undoubtedly saved inventors and others much money that would otherwise have been spent in carrying out experiments on various aviation devices that were either theoretically wrong or would be of little practical use had they been followed up. Two biplanes of his design are at the present time being built by the Grahame-White Aviation Co. at Hendon, where also Maurice Farman biplanes are being constructed under his supervision by the Aircraft Company. Referring to these machines, it is interesting to recollect that just lately when Mr. Maurice Farman visited the works he was exceedingly pleased with the manner in which the construction was being carried out. Further, Mr. Barber has been acting for some time now as sole consulting expert to all the Lloyds' underwriters who handle aviation risks.

Perhaps it is not generally known that for many years Mr. Barber has been extremely interested in dirigibles and has at various times taken out patents concerning them. From certain drawings, of which I have been favoured with a private view, it seems likely that something extremely interesting in this direction will materialise in the near future.

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PARLIAMENT AND AIRCRAFT.

MR. WINSTON CHURCHILL was again subjected to a long interrogation on the subject of naval aeronautics on Wednesday of last week. The fire of questions was opened by Mr. Eyres-Monsell, who sought information as to the Willows airship. Mr. Churchill replied that the trials of the small Willows airship had proved quite satisfactory for the limited purposes for which it was intended. With regard to the future, Mr. Churchill said that the future air programme for next year would, he presumed, be announced when the future Army Estimates were put forward, and so would the future Naval air programme for that year, so far as it could properly be disclosed. The amount of progress made in the aeroplanes of the Navy in the present year was very remarkable.

To a question as to whether the Committee on Air-Craft had come to any conclusion in respect of the relative merits of rigid and non-rigid airships, and how many rigid airships were built, building, or projected for Great Britain, Mr. Churchill replied that the deliberations of the Air Committee and their recommendations were confidential. The question of rigid airships was receiving attention.

Mr. Churchill further stated that steps were being taken to safeguard our shore magazines from aerial attack.

A question by Mr. Fell as to whether the Admiralty had decided to erect a garage for dirigibles and aeroplanes on the East Coast or in East Anglia only elicited the information that all these matters were being studied, but Mr. Churchill was not in a position to make any statement upon them at present. He hoped, however, he would be able to give full information to the House. In reply to Mr. Joynson-Hicks, he stated that the speed of the small Naval airship, which was used for instructional purposes, and was the only one we had at present, was just over 30 miles per hour. We had in the Naval Wing of the R.F.C. several aeroplanes that could exceed the speed of the latest Zeppelin.

As to the latest German airships, Mr. Churchill said he was now informed that there were two other Zeppelins belonging to the German Army in addition to those he mentioned a week previously. "Z I" was completed in 1905, and reconstructed in 1911, but he was informed that, so far as was known at the Admiralty, she had not been flying recently. The other, "Z III," according to the German Press, was taken over by the military authorities at the end of July last.

On Tuesday last Mr. Churchill, in reply to Mr. Norton Griffiths, supplemented this information by saying that Germany had also fourteen private airships of which seven were under 3,500 cubic metre volume and were of little value, and one other, the "Suchard," was built for an attempt to cross the Atlantic. £97,847 was voted in the German Naval Estimates for 1912-13 for airships and experiments with airships. £144,325 was included in the German Naval Estimates for 1913-14, not yet voted, for aeronautics, aviation experiments, and special allowances.

As to Great Britain, the Royal Flying Corps possessed the following airships: Military wing: "Beta," "Gamma," "Delta," and a new "Gamma" under construction, to the cost of which naval funds will contribute half. Naval wing: the "Willows" airship, one "Astra Torres," and one "Parseval," the last two being on order.

On December 5th, Mr. Joynson-Hicks raised the matter of the Army's ban on monoplanes, and asked Col. Seely why the Army thought it necessary to appoint a Committee to consider the matter when the Navy did not, and whether this difference of opinion between the two wings of the R.F.C. was due to the advice of civilian experts being taken by the Army.

Col. Seely replied that the committee was appointed in order to investigate the accidents by which military officers lost their lives, and to make recommendations to minimise the risk of accident in the future.

As to why the Navy was still flying monoplanes, while the Army was not allowed to do so, though it wished to, Col. Seely said it was considered possible in view of the two very distressing accidents that had happened that there might be structural defects in the monoplanes in the possession of the Army. He therefore took the responsibility of ordering this inquiry and stopping the supply until further light was thrown on the matter. He believed the committee were on the point of reporting.

Replying to the questions in the House of Commons on Monday, Mr. Churchill gave the following information regarding the pay of the Naval Wing of the Royal Flying Corps:—

"The extra rates of pay for naval and marine officers of the Royal Flying Corps are as follows: Ordinary pay of squadron commander, 25*s.* a day; flight commander, 17*s.*; flying officer, 12*s.* The flying pay is 8*s.* a day. The commanding officer of the Naval Wing receives £800 a year, with quarters. Flying pay is paid continuously to aeroplane flyers, but only on days of ascent in the case of airships. Thirteen naval and marine officers who are qualified aviators have been appointed to the Naval Wing of the Royal Flying Corps, with the increased rates of pay. Four officers are serving on the staff of the Central Flying School with increased rates of pay. Five other officers have just graduated, and will be graded as flying officers immediately."

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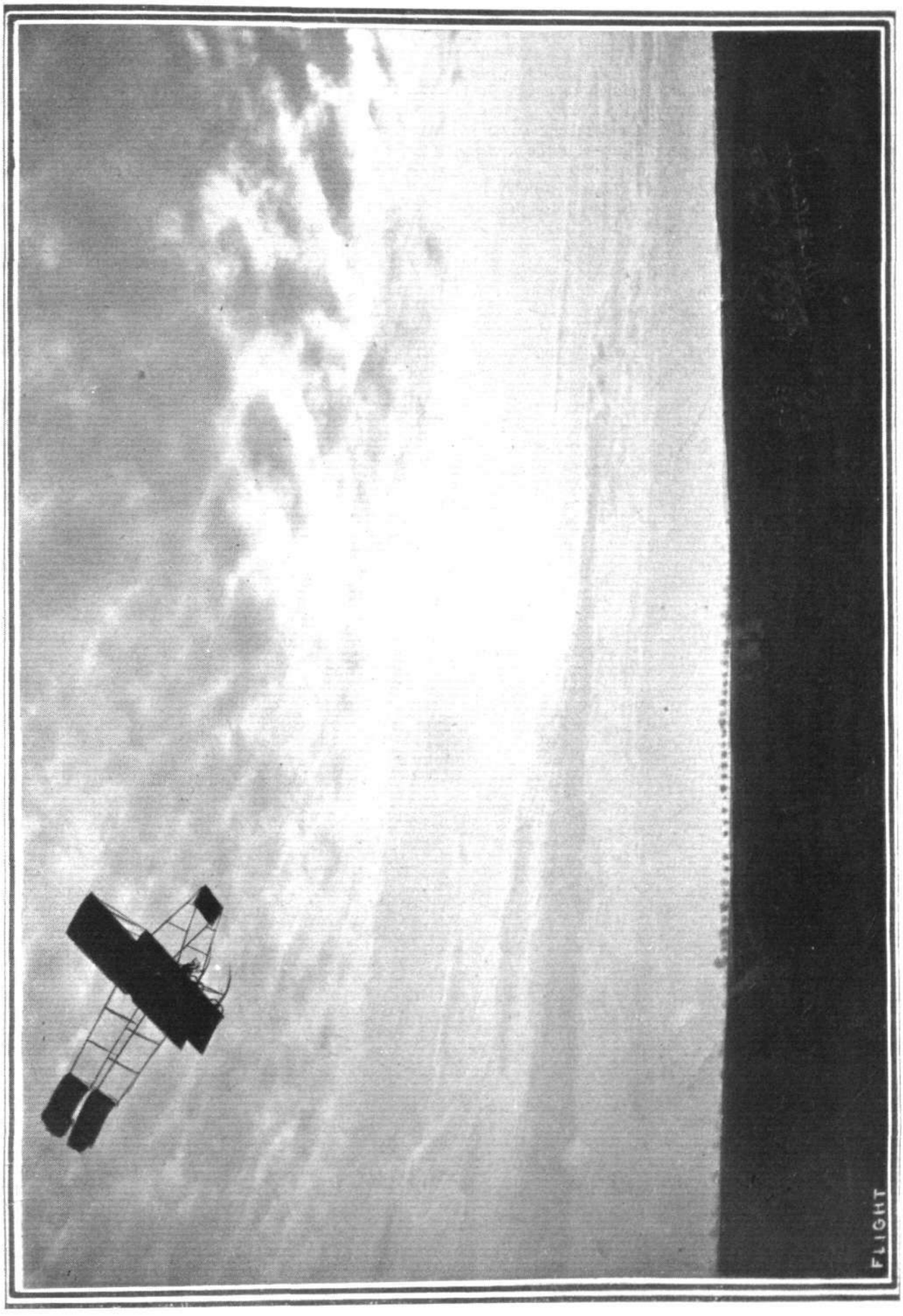
Monoplane on a Suburban Roof.

PALMER'S GREEN literally had aviation brought to it's—roof, on Friday of last week when Mr. J. B. Manio, in endeavouring to complete his flight from Paris to Hendon, found himself in difficulties with his engine, and was forced to land on the roof of a house. Continuing his journey from Sittingbourne, where, as mentioned in last week's FLIGHT, his journey was temporarily stopped through motor trouble he had, on the 5th inst., restarted, but lost his way in the thick mist, and found himself over the heart of the City. Realising his position he turned, and making his way back to Barking, effected a landing in order to get directions. He set off again, but once more getting off his course, and landing in the Park of Sir George Faudel Phillips, at Balls Park, Hertford, owing to shortage of lubricant, decided to stop for the night. The next afternoon he again set out for Hendon, but the strong west wind carried him to the east of his proper course, and when the machine was over Palmer's Green the engine again began to give trouble. Mr. Manio endeavoured to get down into Bloomfield Park, but finding this impossible, tried to rise again. The machine, however, did not respond, and settled down with a crash on the roof of 75, Derwent Road. Both the roof and the machine were considerably damaged, but the pilot remained in his seat and was eventually rescued by means of a ladder, little the worse for his experience. Firemen assisted to tie the machine down securely for the night, and the next day it was removed piecemeal from the house by the Grahame-White Aviation Co.



A German-built Bristol biplane at Halberstadt piloted by Mr. E. Harrison of the Bristol Co.

EDDIES.

FOLLOWING the remarks in last week's columns, relative to some of the totally impossible situations that some writers of aviation stories devise, one of FLIGHT's readers has sent along a most excellent specimen of a case in point. The story runs in this way. Pilot has just given an exhibition flight, and is waiting for someone among the crowd to volunteer to go up with him—for the usual fee of two guineas, of course. Curiously enough, no one seems very keen. However, after a few minutes' delay, a swarthy gentleman, rather flushed, breaks through the crowd and says he'll go. He does.

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They have not been long in the air when the passenger brings out a Browning and threatens to shoot the pilot if he attempts to return to the aerodrome. He was a murderer, you see, and had just managed to get aboard the machine and fly away when two detectives appeared on the ground. The pilot, for a moment, is at a loss what to do, and consequently "holds the machine hovering." Even this is somewhat of an accomplishment, but a bit later on he goes one better. The passenger explains that he had shot the husband of a woman for his ill-treatment of her. He mentions the name of the woman in question. The pilot recognises it. It is the very woman that is in love with him. He was aghast, and his "hand on the propeller jerked the machine backwards," and so on. If that pilot could only practise up a few such "stunts" he could make quite a good thing out of it in the States.

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Talking of books brings it to my mind that Messrs. Claude Grahame White and Harry Harper, are, in collaboration, producing another aviation book. They have already produced four, two of which have been boys' books, and all of them have had a remarkable success. The new one they are turning out for Messrs. Cassell and Co., and the plot will revolve around an ambitious type of aeroplane, with dual power plant, capable of varying its wing surface, of carrying twelve people, and of maintaining a maximum speed of 120 m.p.h., or thereabouts. Needless to say, the technical details of this book will be accurate enough in all conscience; in fact, it is the aim of the authors to interweave into an exciting story quite a lot of useful information.

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It is perhaps not generally known that five years ago Rene Caudron was a farmer, and that his brother Gaston, at that time, intended to follow a commercial career. But an attraction towards aviation gripped them when the Wright brothers carried out their preliminary flights in France, and they set to work to build a machine which was produced in 1908. It was a glider, and they managed to fly it by enlisting the services of a fast trotting horse and suitable tackle, and thus gained a lot of useful experience. The next year they obtained one of Anzani's first aero engines, and fitted it to drive the propeller through chain transmission. This machine left the ground at the first attempt, and, apart from the fact that propellers now are direct driven, and that a little boat body is provided for the comfort of the pilot, the design of the machine as it stood then has remained practically unchanged.

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Those who were fortunate enough to visit the Paris Aero Salon could not have helped but notice the little *aeroplage*, a light chassis running on four wheels of a fairly wide track, and fitted with a leg o' mutton sail to drive it along in a wind, exhibited on the Blériot stand. M. Louis Blériot invented this sporting little vehicle so that he and his family could amuse themselves by running over the sands on it at Hardelot Plage when the wind was too strong for flying experiments. It seems that the *aeroplage* is going to attain considerable popularity, for our French contemporary *l'Aero* is organising a meeting, which will take place next year on one of the extensive stretches of sand that are to be found around the French coast, in which land-yachts of this type will compete. Already they have five entries. Three of the machines entered have been constructed by well-known aeroplane manufacturers, Messrs. Borel, Hanriot, and L. Clement to wit, and two of them will be "flown" by qualified aeroplane pilots, and one of the others by a dirigible pilot.

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M. L. Clement, who will be remembered as having constructed that magnificent all-steel specimen of an Hanriot monoplane that formed one of the features of the Paris Show, has said that the *aeroplage* he is putting through his works to the design of a customer will be an all-steel machine, and capable, he hopes, of high speed. Another pilot constructor of a little sea-shore yacht of this type says that during the past summer at Berck Plage he has, with a passenger on board, maintained a speed of over 30 miles an hour.

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Personally I should think that *aeroplageing* would be particularly good fun, especially if the pilot happened to know a little about handling a sailing boat beforehand. And even if he didn't it wouldn't take him more than half an hour to pick it up. Why not make a suggestion that some of our flying schools build such machines? They would cost practically nothing to build, and, let out to pupils at 5s. an hour or thereabouts on a windy day when there was no flying to be done, they would form a source of income which, if not large, might at least be expected to pay the salaries of one or two mechanics. It would at any rate beat the oscillator hollow.

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Then, following up the same line of thought, why not keep a stud of *aeroplages* handy at, say Hendon for instance, so that they can be brought out to amuse the public when it is too windy to do much flying. But then, in these times, it is so very rare, particularly when there is a crowd waiting to see a show, that there is too much wind to prevent a machine going up.

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Mr. Lawrence Santoni, ever a busy man, has just returned from Italy, where he has formed a large company, the Societa Italiana degli Aeroplani, to take over the Italian rights of constructing Deperdussin monoplanes from designs furnished by the French and the British Deperdussin companies. The control of the Italian factory for turning out these machines will remain in the hands of the British company.

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A week or so ago, I mentioned in these columns that Jules Nardini might be called away abroad at any time to test a new hydro-monoplane that has been built to the designs of Lieut. Calderara. Signor Nardini left England

for Venice on Monday last, and before long I hope to be able to pass on to readers a brief account of his experiences there. The machine he has gone to fly is rather a novel design for a hydro-monoplane.

* * *

The second of the Flanders monoplanes has, as was mentioned in last week's issue, been accepted by the Royal Flying Corps. This machine only arrived at Brooklands from the Richmond works of Messrs. L. Howard-Flanders, Ltd., on November 30th, so there was not a great deal of time to do any tuning up that might have been necessary before it was delivered at Farnborough on December 3rd. Indeed, such is the care taken on both design and construction in the Flanders works, that scarcely any tuning was needed. In the test climb, the 70-h.p. Renault-engined monoplane mounted to 1,000 ft. in 3½ mins., 1,500 ft. in 5½ mins., and 2,000 ft. in 8 mins.—pretty good going in view of the fact that in the design of the machine Mr. Flanders has sacrificed a portion of the possible rate of climb to obtaining an exceptional modicum of stability.

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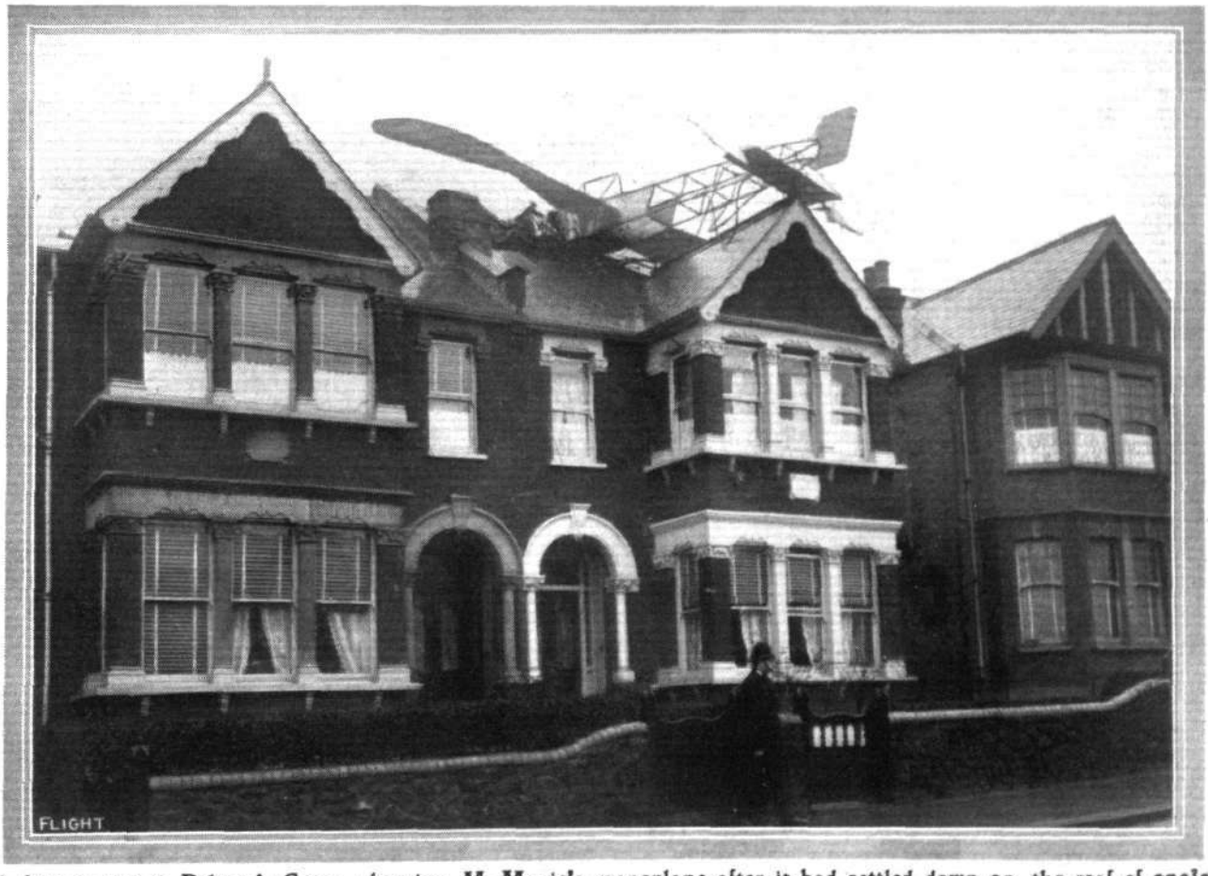
That is, in fact, one of the best points of the Flanders monoplane—its extreme stability in a high wind. The official speed-test that the machine underwent showed a maximum speed of 67·2 m.p.h., and a minimum of 41. This speed variation of 26·2 m.p.h., it is noticeable, has only been exceeded by one machine—the B.E. 2. It is, perhaps, all the more remarkable for, whereas the B.E. 2 is a biplane, the Flanders is a monoplane, and one of a relatively small area at that.

During last week-end, the pilot of the Handley Page monoplane had the great pleasure (?) of flying back to Hendon from Brooklands with a passenger (Mr. Hardwick, assistant manager of Messrs. Handley Page, Ltd.), in a dense fog. The monoplane rose rapidly, reaching a height of 400 ft. as it crossed the track at Brooklands. Ascending higher to 600 ft., the machine ran into a cloud, and the pilot had perforce to bring it to a lower level. The fog was so dense the whole of the time that it was impossible to be sure that the correct direction was being followed, and no help could be obtained from the compass, for the card was sticking.

* * *

However, by making wide sweeps to right and left, Ealing was at last discerned to the left, to the great joy of those on board. As a matter of fact, Ealing should have appeared to the right, but that perhaps was of little consequence, as long as they found some landmark to go by. Reaching Wembley, the fog came on thicker than ever, and it was with no small amount of difficulty that the occupants were able at last to pick up the ordinarily easily recognisable waters of the Welsh Harp at Hendon. An idea of the denseness of the fog may be gathered from the fact that from above the Welsh Harp it was impossible to see the aerodrome, although the distance cannot be more than about half a mile. The time taken from aerodrome to aerodrome was 18½ mins., and on arrival at Hendon the pilot testified to the fact that he had scarcely anything to do excepting to look around, and do his utmost to pick out landmarks that were almost entirely hidden by fog. "OISEAU BLEU."



A flying visit to Palmer's Green, showing *M.* Manio's monoplane after it had settled down on the roof of one of the houses in Derwent Road, Palmer's Green, through engine trouble during his attempt to reach Hendon last week. It is a remarkable fact that the pilot was not injured, although his machine was damaged and a considerable hole made in the roof. M. Manio ultimately regained *terra firma* by means of a ladder.

FROM THE FOUR WINDS.

Attack by Air.

THE LESSONS OF THE SHEERNESS INCIDENT.

MR. CHURCHILL'S statement that all necessary precautions would be taken to protect our naval establishments against aerial observation or attack lends particular interest to the following article by our naval correspondent:—

If we were to learn one morning that a flotilla of foreign destroyers had steamed up the Solent, made a circuit of Portsmouth Harbour, and steamed out again without any effectual note of its presence being taken by those charged with the defence of the place, we should begin to entertain legitimate fears as to the efficiency of the various arms of the national defences.

We do know, however, that it is possible for an unknown foreign airship to circle without interruption or interference of any kind over a British dockyard, and over a harbour containing fifty British warships, both ships and dockyard being alike defenceless against aerial attack.

The First Lord of the Admiralty has categorically stated that "an unknown airship was heard over Sheerness about 7 o'clock on the evening of October 14th," and that he knew it was "not one of our own airships."

A foreign airship, it is admitted officially, was over a British dockyard and war harbour two hours after sunset on an autumn evening, at a time when five European nations were at war, but even if the period had been broad daylight, and the time one of war instead of peace for this country, our position would have been just as helpless.

Neither Sheerness nor any other place on the whole of our coasts would have been in a position to offer any defence against its attack; and there is a touch of irony in the fact that the headquarters of the Naval Flying School is only a few miles from Sheerness.

No Wire Nets on Clouds.

Ultimately it will probably be possible to organise a coast patrol of armed air-craft similar to that now maintained by means of torpedo-boats and destroyers; but even then it will be much easier to miss an airship than it is to miss a battleship or destroyer—which is easy enough—for while the "surface" ship can move only in two dimensions, the airship can move in three.

Against the surface ship, too, harbours can be defended by means of booms, which are effective until they are broken, even when the enemy cannot be seen. You cannot, however, hang wire nets on the clouds to keep out aircraft.

What should be done, with the minimum of delay, is to equip our naval harbours and dockyards with the most efficient defence against aircraft that is procurable.

Several British firms of ordnance manufacturers have turned out excellent guns for attacking aerial vessels, and a proper equipment of these weapons with batteries of searchlights to assist them at night should be regarded as equally essential as defences against torpedo craft.

Very shortly, too, the authorities should have at their disposal flights (the official term) of armed aeroplanes and dirigibles, which could stand in much the same relation to ports and harbours as the patrol flotillas of torpedo craft stand to the coasts; though whether they would be able to maintain a continuous patrol is quite another question.

Depôts for aeroplanes and hydro-aeroplanes are already being established at Port Victoria (in the Medway), Cleethorpes, and Rosyth, thus affording a hint of the organisation that is to come; but the whole problem is a difficult one.

A "Limitless" Range.

An interesting side issue raised by the foreign visit to Sheerness is what shall be the aerial equivalent of the "three-mile limit" as, applied to coasts? An imaginary line three miles from a nation's coasts represents the limit of territorial waters, and these are not entered (in peace) by foreign warships without due notice being given.

The distance was agreed upon before guns attained to anything like their present power, but the underlying idea was that a ship three miles out could do no damage. Conditions have altered a good deal since then.

It is obvious that an airship can do effective damage whatever its height may be. It has been suggested that an aerial height of 1,000 ft. or thereabouts should be regarded as the vertical limit of a nation's jurisdiction; but this would allow perfect freedom to a foreign armed airship to traverse the country at a height of twelve hundred feet. Thanks to gravitation, the "range" of a bomb dropped from an airship is limited only by the first obstacle it meets.

The best plan, surely, is to take an analogy from the submarine, which cannot legally evade the three mile limit by diving under it. Why then should it be suggested that an airship can evade it by sailing over it, at whatever height?—*Evening News*, December 6th.

Bulgarian Aviator's Fate.

Vienna, Sunday.

The *Pester Lloyd* publishes an interesting report concerning the death of a war aviator, Dr. Jules Constantin, a former assistant of the famous Paris surgeon, Dr. Doyen. Dr. Constantin was engaged by the Bulgarian army and received, for his wonderful bravery, a medal from the hand of King Ferdinand. He was engaged to throw bombs from a biplane on to the Turkish army. On his last flight he left Surma, a small village before the Chatalja lines, in an aeroplane, and rapidly disappeared from view. When his machine descended his comrades found him lying dead on the ground, with a wound in the breast. The wings of the biplane were bored with shot. As his barograph showed, he had sailed at a height of 1,220 metres over the Turkish fort, where he photographed the terrain, and there he had evidently been shot, but had strength to guide his apparatus towards the Bulgarian camp. In his hand he still held the helm.—*Morning Post*, December 9th.

Bombs from Airships.

Berlin, December 6th.

The current number of the *Militair Wochenblatt*, the unofficial organ of the Ministry of War, contains an interesting article by Captain von Stockhausen, adjutant to the military commander of Berlin, on the dropping of explosives from airships and aeroplanes.

It is reported, says the writer, that the Italians were at first fairly successful with the bombs dropped in the Tripoli War, but afterwards not at all. It is evident, he contends, that the hits were purely accidental, for the official tests made by the Prussian military authorities at Döberitz and also in France have proved that it is possible to make accurate hits with air-bombs. Practice is, of course, he remarks, necessary, but lack of it does not account for the Italian failures. Presumably the Italians flew only by day and aimed at living objects, and as an explosive body dropped from a height of 1,600 ft. requires 12 secs. to reach the ground, an attentive observer can easily avoid it. The Arabs, he remarks, were at first totally unacquainted with air-bombs, but very soon understood their import. The writer points out, further, that an explosive body dropped from a height of 1,600 ft. has attained a velocity on reaching the earth of over 300 ft. per second, that much of its explosive force is unavoidably lost, and if the charge be very great the bomb is resolved into a number of ineffective atoms. Shrapnel with a time fuse he declares to be at present useless.

The writer comes to the conclusion that explosive bodies aimed during the day at living objects, however numerous these may be, will not do much harm, and declares that the uneasiness felt in respect of the large number of flying machines possessed by the French is, as far as living objects are concerned, groundless.

More interest attaches, however, he continues, to the question of dropping of explosives on inanimate objects, but even in this case he states that success can be achieved only if a large quantity of explosive matter, at least 150 to 200 pounds, be dropped at once. The use of aeroplanes for this purpose, he declares, is impossible, and he asks: "What nation possesses an airship at all approaching in value to our Zeppelin cruisers? Is there one unrigid or semi-rigid airship which can attain such speed or has such carrying power? Can one of them hold an exact course or remain stationary over a definite point?"

Captain von Stockhausen mentions that aeroplanes are useless in the dark, whereas Zeppelin cruisers can fly and be directed equally well by day or by night. The advantages of Zeppellin cruisers are therefore, he states, in conclusion, overwhelming, and the motors are constantly being improved. He hears that Count Zeppelin has been compelled to advance money from his private purse to carry on the manufacture of airships at Friedrichshafen, and adds that if Count Zeppelin's patriotic enterprise is really in financial difficulties, an appeal to the German people will certainly not be made in vain.—*Morning Post*, December 7th.

Hydro-Aeroplanes Wanted for Norway.

A FIRM in Norway has communicated with us to the effect that there ought to be a very good business for hydro-aeroplanes in that country, and they are anxious to get into touch with some first-class English constructors, with a view to representing them. The firm in question represents one of the largest British automobile manufacturers, and any aeroplane maker interested in the matter should communicate with us at once.

Aeronautical Engines. By A. GRAHAM CLARK. TABLE I.—Construction and Materials of Principal Parts. (See pp. 1176-8.)

Name.	Country of Origin.	Form of Cooling.	Cylinders.		Valves.		Pistons.		Connecting Rods.	Crank-Shaft.	Main Bearings.	Crank-Case.
			Body.	Jacket.	Position.	How actuated.	Body.	Rings.				
A.B.C.	G.B.	Water	Forged steel	Steel-plated with copper on inside, secured by oxy-acetylene welding	Overhead vertical	Rocking lever and push rods	Steel	Cast iron and phosphor bronze	H. section, steel	3 per cent. nickel chrome, 2 connecting rods per crank	White metal between each crank	Steel casting, no horizontal joint.
Alvaston	G.B.	Water	Cast iron	Sheet metal, riveted	In head	Single push rods for both valves	..	..	Chrome vanadium steel	Chrome vanadium steel, two throw	Phosphor bronze, two bearings	Aluminium alloy.
Albatross	Am.	Water	Semi-steel	..	In head	Rocking lever and push rods	Semi-steel	Cast iron	H. section, vanadium steel	Solid nickel chrome, two throw	White metal, two bearings	Aluminium alloy.
Anzani	F.	Water	..	..	In head	Auto. inlet. Exhaust by rocking lever and push rod	Cast iron	Cast iron	H. section ..	Nickel chrome, two throw (6 cylinder)	White metal, two bearings	Aluminium alloy.
Argus	G.	Water	Cast iron	Integral with body	Overhead vertical	Rocking levers and push rods	Pressed steel	Cast iron	H. section ..	Nickel chrome	White metal between each crank	Aluminium alloy.
Austro-Daimler	A.	Water	Cast iron	Copper electrolytically deposited	Overhead V	Rocking levers and push rods	Pressed steel	Cast iron	H. section, 4 bolts	Nickel chrome	White metal between each crank	Aluminium alloy.
Barr. and Marre	F.	Water, air-cooled head	Cast iron	Aluminium. Steel rings shrunk on	Overhead vertical	Auto. inlet. Rocking levers to exhaust	..	..	..	..	..	Aluminium alloy.
Chenu	F.	Water	Cast iron	Integral with body	On one side	Camshaft in crank case	Pressed steel	Cast iron	H. section, chrome steel	Nickel chrome steel	Die cast. White metal between each pair of cranks	Aluminium alloy.
Curtiss	Am.	Water	Cast iron	Monel metal brazed	Overhead V	Rocking lever and single push rod	Cast iron	Cast iron	Tubular chrome nickel	Nickel chrome steel	White metal bearing between each crank	Aluminium alloy.
Dorman	G.B.	Water	Cast iron	Spun copper. Steel rings shrunk on	Overhead V	Rocking lever and single push rod	Cast iron	Cast iron	H. section. (See description)	Nickel chrome steel. Two connecting rods per crank	White metal bearing between each crank	Aluminium alloy.
Daimler-Mercedes	G.	Water	Cast iron	Integral with body	Overhead vertical	Rocking levers and push rods. 100 H.P. overhead camshaft	Pressed steel	Cast iron	H. section, nickel chrome	Nickel chrome steel	White metal	Aluminium alloy.
Frontier	Am.	Water	Cast iron	Copper electrolytically deposited	At side	Camshaft in crank case	Cast iron	Cast iron	Tubular, nickel chrome	Nickel chrome steel	Ball bearings between each crank	Aluminium alloy in one piece
Fox	Am.	Water	Cast iron	Cast aluminium	At side	Piston	Cast iron	Cast iron	H. section, nickel chrome	Nickel chrome steel	White metal bearing between each crank	Aluminium in one piece.
Gnome	F.	Air	Nickel steel	..	In piston for inlet; in head for exhaust	Auto. inlet. Rocking levers to exhaust	Steel	Bronze	H. section, nickel chrome	Nickel chrome steel	Ball bearings	Steel.
Green	G.B.	Water	Cast iron	Spun copper with rubber ring	Overhead vertical	Overhead camshaft	Cast iron	Cast iron	H. section	Chrome vanadium steel	White metal bearing between each crank	Aluminium alloy.
Gyro	Am.	Air	3 per cent. nickel steel	..	Inlet in piston. Exhaust overhead	By connecting rod. By rocking lever and push rod	Steel	..	H. section, nickel steel	Chrome nickel steel	Ball bearings	Vanadium steel in halves.
Hall-Scott	Am.	Water	Cast iron. Separate head	Steel shrunk on and nickel plated	In head	By rocking lever and push rod	Cast iron	Cast iron	Tubular, nickel steel	Chrome nickel steel	White metal	Aluminium alloy.
Kirkham	Am.	Water	Cast iron	Integral with body	In head	By rocking levers and push rods	Cast iron	Cast iron	H. section, 3 per cent. nickel steel	Nickel chrome steel	White brass bearing between each crank	Magnalfum alloy.
Maximotor	Am.	Water	Semi-steel	Integral with body	At side	Camshaft in crank case	Semi-steel	Cast iron	Manganese bronze	Nickel chrome steel	Ball bearings between each pair of cranks	Aluminium in one piece, with head holes.
N.E.C.	G.B.	Water	Cast iron	Copper electrolytically deposited	At side	Special	Cast iron	Cast iron	H. section, vanadium steel	..	White metal	Aluminium.
Panhard	F.	Water	Cast iron	Integral with body	At side	Camshaft in crank case	Pressed steel	Cast iron	H. section, nickel chrome	Nickel chrome steel	White metal	Aluminium alloy
R. E. P.	F.	Air	Cast iron	..	In head V	Both valves by single rocking lever and push rod	..	..	H. section	..	Ball bearings	Aluminium alloy.
Renault	F.	Air	Cast iron	..	At side	Camshaft in crank case	Cast steel	Cast iron	Special steel	Special steel	White metal end ball bearings. Others in phosphor bronze housings	Aluminium alloy.
Salmson	F.	Water	Steel	Copper brazed at head and silver soldered at bottom	In head, vertical	Rocking levers and push rods	Cast iron	Cast iron	Special steel, H. section	Special steel. One crank	Ball bearings	Aluminium alloy or steel.
Sturtevant	Am.	Water	Semi-steel	Integral with body	On one side	Camshaft in crank case	Semi-steel	Cast iron	H. section, nickel chrome	Nickel steel	Die-cast white brass between each crank	Aluminium alloy.
Wolseley	G.B.	Water	Walls of steel, heads of cast iron	Aluminium. Bottom joint Dermatine ring	In head V	Camshaft in crank case. Rocking levers and push rods	Drawn steel	Cast iron and phosphor bronze	Nickel chrome	Nickel chrome steel	White metal between each pair of cranks	Aluminium alloy.

Aeronautical Engines. By. A. GRAHAM CLARK.

TABLE II.—Principal Dimensions, &c., of Aeronautical Engines.

(See pp. 1175 and 1178.)

Name.	Country of Origin.	Number of Cylinders.	Bore and Stroke. In. or MM.	Type.	Form of Cooling.	b.h.p.	Revs. per Min.	ηp lb. per sq.inch.	b.h.p. at 1,200 revs.	Engine Weight complete.	Radiator Water and Piping.	Total Weight.	Weightper b.h.p. at 1,200 revs.
										lb.	lb.	lb.	lb.
A.B.C. ..	G.B.	16	5×4¼	V 90° ..	Water ..	225	1,400	95·4	193	490	*150*	640	3·32
		12	,,	,, ..	,, ..	170	1,400	96·0	145·7	390	*130*	520	3·57
		8	,,	,, ..	,, ..	115	1,400	97·4	98·6	290	*90*	380	3·85
						140	1,700	97·6					
		6	,,	,, ..	,, ..	85	1,400	96·1	72·9	220	*70*	290	3·98
						105	1,700	97·7					
		8	3¾×3½	,, ..	,, ..	60	1,450	118·8	49·7	175	*56*	231	4·66
						85	2,375	102·6					
		6	,,	,, ..	,, ..	45	1,450	118·6	37·2	175	*50*	225	6·05
						65	2,375	104·6					
		4	,,	,, ..	,, ..	30	1,450	118·6	24·8	110	*45*	155	6·25
						44	2,375	106·1					
Alvaston	G.B.	2	114×114	Horzl. opp.	,, ..	20	1,200	92·9	20	95*	*40*	135	6·75
		2	132×127	,,	,, ..	30	12,00	93·3	30	120*	*45*	165	5·50
		4	114×128	,,	,, ..	50	1,200	103·5	50	160*	*56*	216	4·32
Adams-Farwell	Am.	5	6×6	Rotary ..	Air ..	72	950	70·7	90·9	285*	..	285	3·14
Albatross	Am.	6	4½×5	Radial ..	,, ..	50	1,230	67·5	48·8	250*	..	250	5·13
		6	5½×5	,, ..	Water ..	100	..	..	..	275*	*90*	365	..
Anzani ..	F. ..	3	105×130	72° semi-radial	Air ..	44	1,575	105·8	33·0	154*	..	154	4·67
		3	105×120	Radial ..	,, ..	30†	1,300	94·7	27·3	121*	..	121	4·43
		6	90×120	,, ..	,, ..	45†	1,300	99·1	41·0	154*	..	154	3·76
		6	105×120	,, ..	,, ..	60†	1,300	94·7	54·6	200*	..	200	3·67
		10	90×130	,, ..	,, ..	80†	1,250	98·9	75·6	238*	..	238	3·15
		10	105×140	,, ..	,, ..	100†	1,100	96·0	107·5	308*	..	308	2·96
Argus ..	G. ..	4	124×130	Vertical ..	Water ..	50†	1,250	81·6	47·3	264*	33	297	6·28
		4	,,	,, ..	,, ..	70†	1,250	114·3	66·3	287*	40	327	4·94
		4	140×140	,, ..	,, ..	100†	1,250	118·8	94·7	309*	46	355	3·75
		4	155×165	,, ..	,, ..	150†	1,250	123·4	142	420*	53	473*	3·34*
Austro-Daimler	A. ..	4	100×120	,, ..	,, ..	40†	1,450	93·7	32·7	165	Rad. 27 Wa. 22	214*	6·55*
		4	120×140	,, ..	,, ..	65†	1,350	97·3	57·0	232	Rad. 38 Wa. 28	298*	5·23*
		6	,,	,, ..	,, ..	90†	1,300	93·3	82·0	316	Rad. 44 Wa. *35*	395*	4·72*
		6	130×175	,, ..	,, ..	120†	1,200	91·9	118·4	420	Rad. 50 Wa. *45*	515*	4·35*
Barri. and Marre	F. ..	4	112×100	,, ..	Water, Air cooled head	30†	1,400	69·6	25·4	266	28	294	11·5
Burlat ..	F. ..	8	95×120	X Rotary ..	Air ..	35†	956	68·8	43·3	187*	..	187	4·32
		8	,,	Rotary ..	,, ..	35†	956	68·8	43·3	187*	..	187	4·32
		8	120×120	X Rotary ..	,, ..	60†	940	75·2	75·5	264*	..	264	3·5
		8	,,	Rotary ..	,, ..	60†	940	75·2	75·5	264*	..	264	3·5
		8	120×170	X Rotary ..	,, ..	75†	940	66·3	94·3	308*	..	308	3·27
		16	120×120	Rotary ..	,, ..	120†	900	78·5	157·6	495*	..	495	3·14
Chenu ..	F. ..	4	110×130	Vertical ..	Water ..	52.4†	1,309	103·6	47·4	257*	*56*	313	6·61
		6	,,	,, ..	,, ..	83.7†	1,356	106·6	73·1	394*	*72*	466	6·38
		6	150×200	,, ..	,, ..	210†	1,200	105·6	207·1	860*	*150*	1,010	4·88
Clement ..	F. ..	4	100×120	,, ..	,, ..	41†	1,500	90·7	31·6	242*	*45*	287	9·09
		4	190×230	,, ..	,, ..	220†	1,200	90	217	1,100*	*150*	1,250	5·77
Clerget ..	F. ..	7	120×120	Rotary ..	Air ..	50—60†	1,200	56·9	50	198*	..	198	3·96
		4	110×120	Vertical ..	Water ..	50†	1,500	93·7	39·5	165*	*50*	215	5·45
		4	140×160	,, ..	,, ..	100†	1,250	103·9	94·6	341*	*90*	431	4·56
		8	,,	V ..	,, ..	200†	1,250	103·9	189·2	495*	*150*	645	3·41
Curtiss ..	Am.	4	4×5	Vertical ..	,, ..	40	1,200	105·0	40	162	48	210	5·25
		6	,,	,, ..	,, ..	60	1,200	104·8	60	256	64	317	5·28
		8	,,	V 90° ..	,, ..	75	1,200	98·5	80	286	69	355	4·44
Dorman ..	G.B.	8	4×4¾	V 90° ..	Water ..	80	1,300	102·0	73·8	360*	*72*	432	5·86
De Dion ..	F. ..	8	100×120	,, ..	Air ..	80†	1,700‡	79·9	55·7	484*	..	484	8·69
		8	125×150	,, ..	Water ..	150†	1,600	81·5	110·9	968*	*130*	1,098	9·91
Daimler-Mercedes	G. ..	4	120×140	Vertical ..	,, ..	70†	1,400	101·1	59·2	278*	*70*	348	5·88
		6	,,	,, ..	,, ..	100†	1,350	99·8	87·7	420*	*90*	510	5·81
		8	175×165	,, ..	,, ..	240†	1,100	90·7	266·3	1,830*	*160*	1,990	7·48
Frontier ..	Am.	4	4⅛×4¾	V 90° ..	,, ..	60	1,200	84.7	60	290*	70	360	6·0
		6	,,	Vertical ..	,, ..	35	1,400	98·5	30	—	*45*	—	—

Fox .. (Two stroke)	Am.	3	4¾×4¾	Vertical ..	Water ..	45	1,000	70·6	54	150*	*56*	206	3·82
		4	,,	,, ..	,, ..	60	1,000	70·6	72	190*	*63*	253	3·52
		6	,,	,, ..	,, ..	90	1,000	70·6	108	280*	*90*	370	3·42
		4	,,	Opposed ..	,, ..	60	1,000	70·6	72	175*	*63*	238	3·31
		6	,,	,, ..	,, ..	90	1,000	70·6	108	250*	*90*	340	3·15
Gnome ..	F. ..	7	110×120	Rotary ..	Air ..	50	1,200	68·8	49·3	167*	..	167	3·39
		7	130×120	,, ..	,, ..	70	1,200	69·0	69·0	182*	..	182	2·64
		7	124×140	,, ..	,, ..	80	1,200	74·1	78·9	191*	..	191	2·42
		14	110×120	,, ..	,, ..	100	1,200	68·8	98·6	220*	..	220	2·23
		14	130×120	,, ..	,, ..	140	1,200	69·0	138·0	286*	..	286	2·07
		14	124×140	,, ..	,, ..	160	1,200	74·1	157·9	308*	..	308	1·95
Green ..	G.B.	4	105×120	Vertical ..	Water ..	30	1,100	85·1	32·7	182	*45*	227	6·95
		4	140×140	,, ..	,, ..	62	1,155	77·5	64·4	302	73	375	5·82
		6	,,	,, ..	,, ..	100	1,150	83·7	104·3	420*	*90*	510	4·88
Gyro ..	Am.	7	4·3×4·75	Rotary ..	Air ..	50	1,150	71·4	52·2	100*	..	160	3·06
Grey Eagle	Am.	6	4×4½	Vertical ..	,, ..	50	1,100	106·0	54·5	260*	..	260	4·77
Hall-Scott	Am.	4	4×5	,, ..	Water ..	44	1,500	92·4	35·2	*160	Rad. 12 Wa. *20*	192	5·45
		8	4×4	V 90° ..	,, ..	65·5	1,500	86·0	52·4	*265	Rad. 21 Wa. *28*	314	6·0
		8	4×5	,, ..	,, ..	83	1,500	87·2	66·4	*290	Rad. 36 Wa. *32*	358	5·4
Kirkham	Am.	4	4⅛×4¾	Vertical ..	,, ..	40·4	1,400	89·9	34·6	180*	46	226	6·53
		6	,,	,, ..	,, ..	54·5	1,300	87·2	50·3	235*	58	293	5·82
Laviator	F. ..	6	130×160	,, ..	,, ..	110†	1,100‡	100·5	118·4	616*	*100*	716	6·05
		4	145×175	,, ..	,, ..	120†	1,200‡	110·8	118·4	484*	*110*	594	5·03
		6	180×200	,, ..	,, ..	250†	1,050‡	99·8	281·8	1,210*	*180*	1,390	4·94
		8	100×130	V	,, ..	80†	1,200‡	104·5	78·9	275*	*75*	350	4·45
		8	114×160	,, ..	,, ..	120†	1,200‡	98·0	118·4	418*	*110*	528	4·46
		8	147×175	,, ...	,, ..	200†	1,100‡	98·0	215·2	715*	*150*	865	4·02
Maximotor	Am.	4	4½×5	Vertical ..	,, ..	50	1,200	103·5	50	210*	53	263	5·26
		6	,,	,, ..	,, ..	75	1,200	103·5	75	300*	72	372	4·96
N.E.C. (Two stroke)	G.B.	4	3 11/16×4½	V 90° ..	,, ..	50	1,250	82·4	48	155*	*50*	205	4·28
		6	..	Vertical ..	,, ..	90	1,250	..	86·4	320*	*85*	405	4·69
N.A.G. ..	G. ..	6	150×130	,, ..	,, ..	120*	1,300	85·7	109·2	770*	*100*	870	7·96
Nieuport	F. ..	2	135×150	Horizl. opp.	Air ..	32†	1,120	85·2	33·8	173	*45*	218	6·45
Panhard ..	F. ..	8	110×140	V	Water ..	100†	1,500	80·2	78·9	440*	*90*	530	6·72
R.E.P. ..	F. ..	5	100×140	Semi-radial	Air ..	50†	1,100	105·9	53·8	242*	..	242	4·5
		5	110×160	,,	,, ..	60†	1,100	91·9	64·6	330*	..	330	5·11
		7	,,	Radial ..	,, ..	95†	1,100	90·6	102·2	462*	..	462	4·52
Renault .. (Propeller on camshaft)	F. ..	4§	90×120	V 90° ..	,, ..	25	1,800	59·2	33·4	*242·5	..	242·5	7·25
		8‖	75×120	,, ..	,, ..	40	1,800	68·1	53·4	*242·5	..	242·5	4·84
		8§	90×120	,, ..	,, ..	55	1,800	65·0	73·4	375*	..	375	5·1
		8‖	96×120	,, ..	,, ..	78	1,800	79·8	102·6	397*	..	397	3·865
		12§	,,	V 60° ..	,, ..	100	1,800	79·8	133·4	639*	..	639	4·79
La Rhône	F. ..	7	105×140	Rotary ..	,, ..	50	1,200	62·8	49·3	176*	..	176	3·67
		9	,,	,, ..	,, ..	80	1,200	78·2	78·9	242*	..	242	3·07
		14	,,	,, ..	,, ..	100	1,200	62·8	98·6	308*	..	308	3·12
		18	,,	,, ..	,, ..	160	1,200	78·2	157·8	374*	..	374	2·37
Rossel-Peugeot	F. ..	7	109×110	,, ..	,, ..	30—40	1,100	..	..	165*	..	165	..
		7	110×110	,, ..	,, ..	40—50	1,100	..	..	172*	..	172	..
		7	,,	,, ..	,, ..	50—55	1,150	..	..	165*	..	165	..
Salmson	F. ..	4	140×140	Vertical ..	Water ..	100	1,300	114·1	91·0	352*	*90*	442	4·86
		7	120×140	Radial Vertical	,, ..	80	1,250	75·0	76·8	286*	*75*	361	4·7
		9	,,	,,	,, ..	110	1,280	78·2	103·1	352*	60	412	4·0
		9	150×210	Radial Horizl.	,, ..	300	1,200	78·0	300	990*	*200*	1,190	3·97
Sturtevant	Am.	4	4½×4½	Vertical ..	,, ..	46	1,200	106	46	200*	*54*	254	5·52
		6	,,	,, ..	,, ..	69	1,200	106	69	285*	*70*	355	5·15
Wright ..	Am.	4	4⅜×4	,, ..	Water, Air-cooled head	39	1,600	80·2	29·25	190	43·1	233·1	7·98
		6	,,	,, ..	Water ..	50	1,150	95·5	52·2	230*	*56*	286	5·5
Wolseley	G.B.	8	5×7	V 90° ..	,, ..	126	1,150	78·9	131·5	695	*110*	805	6·12
Verdet ..	F. ..	7	112×140	Rotary ..	Air ..	55	1,100	72·7	59·2	176	..	176	2·98

* No fly-wheel. † Metric. ‡ Crankshaft speed. Propeller on camshaft. § With fan. ‖ Without fan.
Data in italics have been assumed.

AERONAUTICAL ENGINES.

Paper read by A. GRAHAM CLARK before the Institution of Automobile Engineers.

THE problems involved in the design and construction of engines used for aeronautical purposes are such as should make a direct appeal to the automobile engineer for solution, not alone on account of the commercial possibilities of the situation, but because the practical and scientific difficulties experienced are somewhat akin to those which have been overcome in the evolution of modern car engines, and because the production of a satisfactory engine would go far to eliminate one of the chief sources of danger. This is especially so as regards the members of this Institution in view of the comments of the judges in the military aeroplane competition of this year, to the effect that the British engines entered in the competition had "not yet proved themselves capable of equalling the performances of the best foreign high-powered engines." Unfortunately, with comparatively few exceptions, motor car manufacturers have not given the subject the serious attention it deserves, but have, in some cases, endeavoured to obtain a high power/weight ratio by reducing the dimensions of the engine parts of their standard productions, especially those of the cylinder and the crank-case. It cannot be too strongly emphasised that the conditions of service are not less arduous than those under which the ordinary car engine is employed, and, therefore, any sacrifice of strength or rigidity should not be countenanced for one moment. Going even further, it might be asserted that it is not at all improbable that the aeronautical engine of the future will be adapted for use on automobiles, although, it must be confessed, the trend of aero engine design in many quarters at the present day would appear to be opposed to any such prospect.

Before considering the requirements which, from one cause or another, it is either essential or desirable that aeronautical engines should conform to, a few of the outstanding features embodied in current designs will be examined. To facilitate this, as well as to render much descriptive work unnecessary, Table I (page 1175), has been prepared, giving the construction of and materials employed for the principal parts of a number of engines; where the engines produced by any particular manufacturer vary, the data given relate to the type of engine constituting his principal production. The table is instructive as showing the extensive use which is now made of high tensile strength steels for crank- and cam-shafts and for connecting-rods, and of aluminium for the crank-case. With but one exception (a 35-h.p. rotary valve-engine by the Frontier Iron Works of U.S.A.) the engines are of the poppet valve type, and these, in the majority of designs, are placed in the head, and are operated by means of rocking-levers and push-rods.

Table II (pp. 1176–7) gives the principal dimensions, &c., of various engines, and, in compiling this, wherever it has been possible to ascertain the b.h.p. actually developed at any speed of revolution, the data have been employed in calculating the brake mean effective pressure in preference to taking the maker's horse-power at normal

Aeronautical Engines. By A. GRAHAM CLARK. TABLE III.—**Performances of various Aeronautical Engines.**

Name.	Country of Origin.	Number of Cylinders.	Bore and Stroke. In or Mm.	Type.	Form of Cooling.	b.h.p.	Revs.	mp lb. per sq. in.	Fuel Consumption per b.h.p. hour.	Brake Thermal Efficiency.	Oil Consumption per b.h.p. hour.	Engine Weight. Complete.	Fly-wheel.	Total.	Radiator and Piping.	Water.	Total Weight Power Unit.	At 1,200 Revs. per Min. b.h.p.	Weight per b.h.p.	Fuel Consumption per b.h.p. for 5 hrs	Oil Consumption b.h.p. for 5 hrs.	Weight per b.h.p. for 5 hrs. run.
									lb.	Per cent.	lb.	lb.	lb.	lb.	lb.	lb.	lb.		lb.	lb.	lb.	lb.
Albatross	Am.	6	4½×5	Radial	Air	50	1,230	67·5	0·86	15·91	0·26	250	None	250	—	—	250	48·8	5·13	4·3	1·3	10·73
Anzani	F.	3	105×120	,,	,,	30	1,300	94·7	0·632	21·65	0·25	115	None	115	—	—	121	27·3	4·43	3·16	1·25	8·84
	F.	6	105×120	,,	,,	60	1,300	94·7	0·526	26·01	0·18	167	None	167	—	—	200	54·6	3·67	2·63	0·9	7·20
Austro-Daimler	A.	6	130×175	Vertical	Water	120	1,200	91·9	0·61	22·43	0·044	420	None	420	50	45	515	118·4	4·35	3·05	0·22	7·62
Barri, and Marre	F.	4	112×100	,,	,, Air cooled head.	30	1,400	69·6	0·77	17·76	—	243	23	266	10	18	294	25·4	11·5	3·85	—	15·35
Chenu	**F.**	**4**	**110×130**	,,	Water	**52·4**	**1,309**	**103·6**	**0·617**	**22·17**	**0·006**	**257**	**None**	**257**	*32*	*24*	**313**	**47·4**	**6·61**	**3·085**	**0·03**	**9·725**
Chenu	**F.**	**6**	**110×130**	,,	,,	**99·7**	**1,617**	**106·5**	**0·542**	**25·3**	**0·005**	**394**	**None**	**394**	*40*	*32*	**466**	**73·1**	**6·38**	**2·71**	**0·025**	**9·115**
Curtiss	**Am.**	**4**	**4×5**	,,	,,	**40**	**1,200**	**105·0**	**0·684**	**20·00**	**0·05**	**162**	**None**	**162**	**28**	**20**	**210**	**40**	**5·25**	**3·42**	**0·25**	**8·92**
Daimler Mercedes	G.	6	120×140	,,	,,	100	1,350	99·8	0·53	25·81	0·033	420	None	420	50	40	510	87·7	5·81	2·65	0·165	8·625
Green	**G.B.**	**4**	**140×146**	,,	,,	**62**	**1,155**	**77·5**	**0·59**	**23·18**	**0·11**	**265**	**37**	**302**	**41**	**32**	**375**	**64·4**	**5·82**	**2·95**	**0·55**	**9·32**
Gyro	Am.	7	4·3×4·75	Rotary	Air	50	1,150	71·4	0·72	19·0	0·17	160	None	160	—	—	160	52·2	3·06	3·6	0·85	7·51
Hall Scott	Am.	8	4×5	V 90°	Water	83	1,500	87·2	0·61	22·43	0·106	290	None	290	36	32	358	66·4	5·4	3·05	0·53	8·98
Kirkham	Am.	6	4⅛×4¾	Vertical	,,	54·5	1,300	87·2	0·58	23·59	0·06	235	None	235	32	26	293	50·3	5·83	2·9	0·3	9·03
Maximotor	Am.	4	4½×5	,,	,,	50	1,200	103·5	0·54	25·33	0·08	210	None	210	28	25	263	50·0	5·26	2·7	0·4	8·36
R.E.P.	F.	5	110×160	Semi-Radial	Air	60	1,100	91·9	0·595	22·99	0·1	330	None	330	—	—	330	64·6	5·11	2·975	0·5	8·585
Renault*	F.	8	96×120	V 90°	,,	78	1,800	72·6	0·64	21·37	0·045	397	None	397	—	—	397	102·6	3·865	3·2	0·225	7·29
Salmson	**F.**	**9**	**120×140**	**Radial**	**Water**	**110**	**1,280**	**78·2**	**0·61**	**22·43**	**0·059**	**352**	**None**	**352**	**25**	**35**	**412**	**103·1**	**4·0**	**3·05**	**0·295**	**7·345**
Wright	**Am.**	**4**	**4⅜×4**	**Vertical**	,, Air cooled head	**39**	**1,600**	**80·2**	**0·75**	**18·24**	**0·041**	**167**	**23**	**190**	**24·8**	**18·3**	**233·1**	**29·25**	**7·98**	**3·75**	**0·205**	**11·953**
Wolseley	G.B.	8	5×7	V 90°	Water	126	1,150	78·9	0·54	25·33	0·044	635	66	695	60	50	80·5	131·5	6·12	2·7	0·22	9·04

* Propeller driven off camshaft. *Note.*—Data in italics have been assumed from average values. Data in heavy type obtained from official tests.

revolutions. For comparative purposes, the brake horse-powers at 1,200 revs. per minute have been tabulated and the weights given are those per b.h p. at that speed, as it will be admitted that before any comparison as to relative lightness can be effective this important factor must receive some attention. For the same reason, the weight of the radiator, with water and piping, has been added to that of the water-cooled engines in order to obtain the weight of the complete power unit excluding fuel and oil; so far as has been possible, the additional weight has been ascertained from the makers, otherwise it has been estimated from probable average values.

In Table III (page 1178), are the results of tests which have been made by a number of manufacturers on their engines and supplied to the author by them, but those shown in heavy type have been carried out by independent authorities. The high brake thermal efficiency attained by the 6-cyl. 70-h.p. Chenu engine should be noted, as this test was made in the laboratory of the Automobile Club of France. *(To be continued).*

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FROM THE BRITISH FLYING GROUNDS.

Brooklands Aerodrome.

OWING to the unsuitable weather prevailing Saturday, last week, there was practically no flying, and it was not possible to hold any competitions. At noon, advantage was taken of a favourable wind and the Handley Page was flown back to Hendon, the pilot taking a passenger with him.

Mr. Handasyde was testing the engine of the latest Martin-Handasyde monoplane before handing the machine over to the War Office, and the excellence of its running augurs well for the useful work it is likely to perform as a unit of the R.F.C.

There was no flying Sunday, until the afternoon, with the exception of a test-flight of a couple of circuits by Mr. Merriam, on a Bristol biplane, who found the weather conditions too unsatisfactory.

The feature of the Bomb-Dropping and Alighting Competition was a record performance by Mr. Merriam, whose masterly handling of the Bristol biplane enabled him to land dead on the mark after shutting off his engine at a height of over 100 ft.—a performance which was warmly applauded by the crowd of spectators—thus clearly demonstrating the ability of a competent pilot to land at any given point. A little miscalculation in dropping his bomb robbed Mr. Merriam of a prize in the competition, the result being:—1st, Mr. Pashley (Sommer biplane); 2nd, Mr. Knight (Vickers-Farman biplane); 3rd, Mr. Merriam (Bristol biplane). Messrs. Bendall (Bristol) and Alcock (Farman) also competed. During the holding of the competition, Mr. Barnwell made some excellent circuits on the No. 5 Vickers monoplane, which in a few minutes climbed to an altitude of well over 3,000 ft.

Bristol School.—Merriam made a test on Monday morning last week with Lieut. Todd as passenger, but found conditions too bad for school work. Merriam again out for a test in the afternoon, taking Capt. Rickard, then up with Capt. Powell. Bendall took Lieut. Thompson, but darkness prevented further work.

On Tuesday, Bendall first made a trial, and then up with Capt. Powell and Lieut. Thompson. Lieut. Mills was out for a solo, doing excellent figures of eight and landing well. Lieut. Todd was out for a couple of circuits, Mr. Ewing doing a number of straights, as also were Lieuts. MacLean and Shekleton.

School work was resumed after breakfast, Merriam being passenger to Capt. Rickard, giving pupil landing practice. Lieut. Mills satisfactorily passed the tests for his *brevet* in excellent style, showing the making of a good pilot. Capt. Rickard again out for straights, and Mr. Featherstone for a solo, flying very well.

Merriam made a solo, Bendall took up Capt. Powell. Capt. Rickard was out for several straights with Merriam as passenger; Lieuts. Todd, MacLean and Shekleton all were out for solos; Capt. Powell was out with Merriam behind, as was Lieut. Thompson later on.

After making a trial on Wednesday, Merriam took Lieut. Thompson, who had charge of the controls. Wind and rain caused abrupt conclusion of the morning's work.

Merriam took Lieut. Thompson to test conditions in the afternoon, but found them rather unfavourable. Bendall up later on with Capt. Powell, and Merriam, a while afterwards, with Lieut. Shekleton, but weather much too bad for school work.

On Thursday Lieut. Todd made two straights, and then a good circuit after the usual trial, Mr. Featherstone following with two circuits. Bendall was testing a biplane. Capt. Powell ascending in another machine, taking Merriam as passenger. Lieuts. Shekleton and McLean and Mr. Ewing all out for straights, but rising wind prevented further flying.

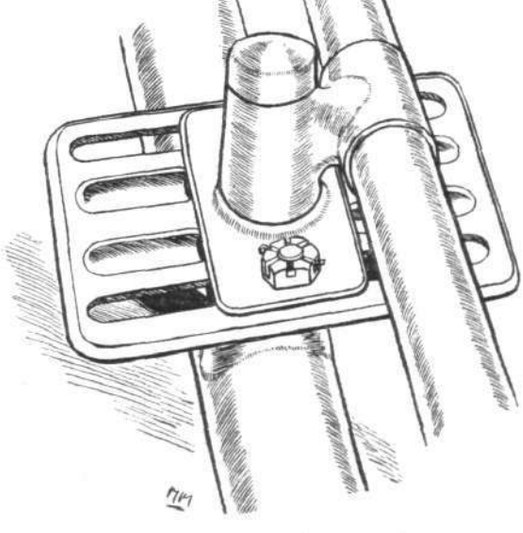
Friday and Saturday were both hopeless as regards the flying, pupils undergoing useful instruction on the machines in the hangars.

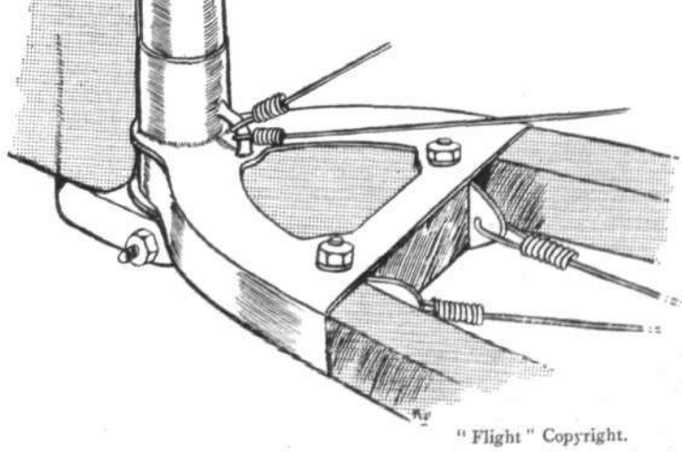
Sunday was one of the busiest days of the week, although the wind was rather rough. Merriam took Mr. Ewing for the trial, and then went up as passenger to Capt. Powell on straights.

In the afternoon Merriam made a test, having Mr. Lane with him, and Bendall was up later; Lieut. Shekleton put up some very good straights considering the state of the weather. Bendall and Merriam then set out for the Bomb-dropping Competition, after which darkness prevented further work.

Ducrocq School.—Tuesday, last week, J. Alcock was making good circuits, flying very high. Also McAndrew circuits very nicely.

Alcock out Wednesday, in the evening, and Thursday doing circuits both morning and afternoon. Sunday he was out again,





"Flight" Copyright.

Two interesting details sketched from the Hanriot monoplanes in the course of construction at Messrs. Hewlett and Blondeau's works. On the left the clever rudder-bar fitting that may be adjusted to suit the length of the pilot's legs. On the right, the rudder post, a good example of acetylene welding.

flying circuits and cross-country trips most of the afternoon, in great style. McAndrew flying circuits, showing great promise of becoming an expert pilot.

On Monday, Alcock flying circuits at considerable altitude for 20 minutes, also testing Mr. Parson's Sommer biplane, fitted with his patent automatic stability device. Tuesday he made good high flight over Weybridge, and surrounding country, ending with long glide from 1,000 ft. Also circuits with passenger.

Vickers School.—Barnwell and Knight on Monday last week testing and adjusting new Vickers-Farman preparatory to pupil work.

Mr. Corballis, Tuesday, after making a few circuits and eights on new biplane, to get his hand in, went straight away for his *brevet* tests, which he passed excellently, his turns being very good and nicely banked, and landing right up to the observers each time. Mr. Pollok, who had previously been flying No. 3 monoplane, then took over the biplane, and in the afternoon took his ticket in splendid style in a distinctly bumpy wind, which gave him plenty to do.

Mr. Pollok having finished with the biplane on Wednesday, returned to No. 3, and did a good many straights before breakfast in a bumpy wind. Later in the afternoon he did several more straights, landing very well on each occasion.

Major Cameron with Knight and Barnwell alternately in passenger seat, on Thursday, doing straights in bumpy wind, giving him plenty of practice with the "joy-stick." He is getting on very well. Meanwhile, Mr. Pollok, flying No. 3 splendidly, and also getting plenty of exercise. He is quite ready for circuits. The wind prevented flying after the morning.

Friday and Saturday no flying; wind and rain.

Sunday afternoon, Barnwell made a flight on No. 5, to test new engine, at about 1,500 ft. Knight meanwhile was giving tuition to Capt. Salmon and Mr. Lane on Farman, and then went for Bomb-dropping Competition, finishing second.

Farnborough (R.F.C.)

Royal Aircraft Factory.—Tuesday, Short tractor biplane out for 1 hour in morning.

Royal Flying Corps.—*2nd Squadron.*—Breguet Flight. No flying has been done owing to the Officers of the Flight being away on duty.

BE Flight. 201.—Tuesday last week Capt. Longcroft with Major Maitland left for Chartley, Stafts, at 9.25 a.m. He was forced to descend at Oxford owing to the heavy mist at 10.15 a.m., slightly damaging his undercarriage in landing. Leaving at 12.45, he arrived at Chartley at 2.20 p.m.

Thursday, Capt. Longcroft made two flights of 10 mins. duration round Chartley, afterwards leaving at 9.10 for Farnborough, he was compelled to land at Wormleighton owing to his petrol pipe breaking. He left Wormleighton at 1.30, but unfortunately ran out of petrol only 2 miles from the aerodrome at Cove. After filling up he arrived at Farnborough at 4.30 p.m.

Monday, Capt. Longcroft out in morning making four flights of 5, 10, 15 and 20 mins. respectively.

Tuesday, Major Burke out for 10 mins. in morning. Afterwards Capt. Longcroft took machine over, making two flights of 15 mins. and 10 mins. with Capt. Becke as passenger, then taking Lieut. Chinery for a 25-mins. trip.

Farman Flight. Tuesday Capt. Becke, with Lieut. Herbert as passenger, left for Plymouth. He was forced to descend at Sherborne owing to his oil supply giving out. Continuing, he ran into a heavy mist near Exeter and was compelled to descend. Leaving Exeter, eventually arriving at Plymouth Polo Ground, having taken 4½ hrs. for the journey.

Thursday, Capt. Becke flying round the Polo Ground for 5 mins.

Friday, Lieut. Herbert out for 5 mins. Capt. Becke and Lieut. Herbert left for Farnborough descending at Exeter and Basingstoke *en route*, finally arriving at Farnborough, having taken 2 hrs. 20 mins. for the journey. This is the longest journey and the fastest time that a machine of the R.F.C. has, so far, accomplished, irrespective of landings *en route*.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—On Tuesday, last week, after having had to wait several days for the weather to calm down, at 11.30 Lieut. Birch started his second part *brevet* tests, coming through well and thus gaining his pilot's certificate, on No. 5 biplane. Lieut. R. G. D. Small doing straights with Chief-Pilot Noel; Mr. Power rolling under supervision of Mr. Manton, Lieut. G. Hallowes (a new pupil) taking a straight passenger flight with Mr. Noel. In the afternoon Lieut. Small and Mr. Power doing straights with Mr. Noel, Lieut. Hallowes rolling with Mr. Manton, later Mr. Noel taking Lieut. Hallowes straight flights in a slight wind.

Blackburn School.—Tuesday last week Mr. Glew got in one flight and in landing managed to crack a skid, this barred further school work for the day, as the brevet machine is only just recovering from Mr. Laurence Spink's somersault and the engine of No. 1 is undergoing repairs.

Pupils all on the spot Wednesday, and two machines ready for use, but the weather was very unpropitious, and remained so for the rest of the week. Time was well spent in the hangar making new planes to replace the somewhat dilapidated ones of the rolling machine, thus in some measure relieving the staff at the Leeds factory, where at present there is considerable pressure of work. After this great things will be expected of the rolling machine.

Blériot School.—Lieut. Loftus Bryan and R. Desoutter out for practice Monday morning last week on No. 1, but after the former had done one roll across and back the wind was too strong for any more rolling work. M. Gandillon did a nice flight across the ground, but was compelled to discontinue for the same reason.

On Tuesday an excellent day's work was got in by the pupils, Messrs. Gandillon, Sacchi, and Reilly flying on L.B. 3 and Lieut. Loftus Bryan and R. Desoutter rolling on L.B. 1. The weather was fine all day and M. Gandillon did several circuits on No. 3 and will soon be ready for his ticket. Lieut. Loftus Bryan and R. Desoutter both had their tails well up and were rolling with confidence.

Wednesday was windy, but on Thursday morning, Lieut. Loftus Bryan and Mr. R. Desoutter were out on No. 1, doing straights very well indeed, and occasionally doing short hops. In the afternoon, Lieut. Loftus Bryan was out again doing straight flights on No. 1, and is making excellent progress.

During the week, Lieut. Eric Conran joined the school for the purpose of obtaining his superior *brevet*. He obtained his ordinary certificate at Hendon a few weeks ago.

Deperdussin School.—Most of the Deperdussin School pupils turned out early Tuesday, last week, under the guidance of the new pilot, Mr. J. Brereton, who gave them a good morning's work. Lieuts. Mapplebeck and Hooper both got busy doing circuits, the former making the figure of 8 in really fine style. Mr. Whitehouse also put in a good practice, making circuits on No. 3 machine. Messrs. Valazzi and Durand were also busy taxying on No. 2 machine, and afterwards were put on to No. 3 *brevet* machine, Mr. Valazzi making exceptionally quick progress. Mr. Scott put in several good straight flights on the same machine. Mr. Phleps also put in an appearance after some weeks absence, and got going on No. 2 taxi machine. Instructor Brock was also out making trial circuits on No. 4 *brevet* machine.

Wednesday, Thursday, Friday and Saturday, the weather being unfavourable for pupils, they were given useful instruction inside. Instructor Brock was out testing on several occasions, but the weather did not improve sufficiently to allow of pupils putting in any work.

W. H. Ewen School.—Owing to the unfavourable weather conditions pupils' flying practice was seriously interrupted during the past week; on Tuesday, however, a long and continuous day's practice was put in, under the instruction of M. Baumann on monoplanes 1 and 2.

Lieut. M. W. Noel and Mr. H. Gist were putting in some excellent work on monoplane No. 2 flying confidently at 30 ft. and 40 ft. and making smooth landings. Messrs. M. Zubiaga, R. S. McGregor and E. T. Prosser put in a splendid forenoon's practice and showed distinct advance on No. 1 monoplane. After lunch the pupils were again out, and capital progress was made by all.

Mr. Sydney Pickles was testing the new 28-h.p. Caudron biplane, and found that the machine behaved in a most efficient manner. Making several circuits of the aerodrome, he rose to an altitude of 600 ft., finishing with a beautiful *vol plané*.

Mr. Lewis W. F. Turner, who has recently been putting up some good exhibitions on a Caudron in the North, has now taken up his duties as chief pilot of the school.

Salisbury Plain.

Bristol School.—High winds all day Monday last week prevented any flying.

On Tuesday, Pizey was out quite early for a test, then taking Lieut. Rees for a couple of flights, putting pupil in pilot's seat, and sitting behind. Pizey also gave two trips to Lieut. Bigsworth on one of the biplanes, and then with Major Macree in a tandem monoplane. Harrison took Lieut. Bigsworth for a flight on one of the biplanes, after which Busteed went for a test of one of the new 80-h.p. Bristols, taking Harrison as passenger. Jullerot went for a solo on a tandem monoplane, and then on one of the biplanes, after which he took Lieut. Bigsworth for a trip. England gave two tuition trips to Lieut. Rees, and a long trip to Mr. Tower.

Lieut. Negrescu, who has made really remarkable progress since he has been at the school, was up for four excellent flights, landing in each case by means of a *vol plané*. Lieuts. Parvelescu and Chiscaneanu each made two good solos on side-by-side monoplane, after which they went out on the 50-h.p. tandem monoplane, and flew this type quite well making a good landing. Capt. Penfold

successfully passed the tests for his certificate, under the observance of Major Higgins and Capt. Connor.

Pizey made the test in the afternoon, Harrison afterwards giving tuition to Lieut. Bigsworth, and Lieut. Rees by England. England made a test later for pupil's solos but found conditions too unfavourable.

No flying on Wednesday, weather too bad. Still no improvement in the afternoon and all work was again confined to the hangars.

On Thursday, Pizey made a test in the morning, but found weather very bad. England was also out on one of the tandems and Busteed on an 80-h.p., but school work was not attempted owing to the bad state of the weather conditions. No flying possible in the afternoon.

Very high winds, with occasional rain, completely foiled attempts at flying on Friday morning.

Slight improvement in the afternoon, and England took out Lieut. Vernon. Pizey giving tuition to Lieut. Bigsworth, and then Lieut. Vernon. Jullerot took Lieut. Rees. Whilst Harrison was out with Lieut. Bigsworth, Busteed made a test on one of the 80-h.p. Bristols, also on the modified Bristol monoplane, fitted with an Anzani engine.

Royal Flying School.—Tuesday *morning* of last week being fair for out-door work, the officers made good use of it. Capt. Fox was first up on biplane 203 doing some scouting around the Plains. His first trip was of 15 mins., during which he went to a height of 3,000 ft. Afterwards during a flight of 13 mins. he was at a height of 4,400 ft. In the afternoon Major Higgins was out on biplane 203, making a splendid high flight which lasted 50 minutes. Capt. Fox then took over the biplane and with Lieut. Lawrence as passenger was flying for 20 mins. at a height of 3,100 ft. around the Downs. Capt. Dawes was out on Maurice Farman biplane 216, and afterwards took up Pte Smith.

On Wednesday Capt. Fox was up on factory biplane 203 for 20 mins.' scouting practice, and a second trip lasted 26 mins. Major Higgins then took charge of the machine, and put up a fine flight of 28 mins. around the Downs.

Capt. Fox, on Thursday, on biplane 203, took up Sergt. Bruce as passenger for 15 mins., at a height of 1,200 ft., and went up again with Air Mechanic Pte. May for 1 hr. 4 mins., during which the greatest height attained was 6,000 ft. Major Higgins, on biplane 203, took up Pte. Baker for a flight of 52 minutes at a height of 5,000 ft. Lieut. Ashton then took over the machine and made a 6 mins. flight. On Friday Major Higgins was out for 12 mins. on 203 biplane, and Lieut. Ashton then took over machine and was in the air for 25 mins. with Pte. Littlejohn as passenger. He subsequently made a 12 mins. flight. No further outdoor work was possible owing to the weather.

Upavon (Central Flying School).

THE year 1912 is so far advanced that one is already looking forward to 1913, with its unknown possibilities as regards the advance and development of aviation. The lessons learnt during the past summer in connection with the military side of aeronautics are sure to have great effect on the ultimate development and organisation of the Royal Flying Corps. Various types of machines have been put through thorough tests in relation to their suitability and efficiency from a military point of view. All kinds of constructional and repair work have been carried out successfully under conditions which were far from satisfactory, and the experience and knowledge gained under such conditions go a long way towards producing efficient mechanics capable of tackling almost any job connected with the maintenance and upkeep of aeroplanes. The various machines at the Central Flying School have been subjected to some very hard work under trying weather conditions, especially during the last few weeks of typical autumn weather. During the past week the weather was very rough, and flying took place on Tuesday only.

Monday, December 2nd, was a failure from a flying standpoint. Very strong westerly winds prevailed all day, with bright sun. The atmospheric conditions did not deter an attempt to reach Farnborough on the Breguet 211, which was successfully accomplished by Lieut. Playfair.

Tuesday, last week, opened misty, with sharp frost. There was bright sunshine up to about ten in the morning, then it came on very dull, with a moderate southerly breeze. Major Trenchard was out for half-an-hour on the Maurice Farman 415, and Lieut. Freeman, R.N., was away for the greater part of an hour on the Maurice Farman 411, after which Lieut. Courtney made a trip lasting about 20 mins. Major Gerrard took Leading Seaman Prickett out for two flights of 15 and 12 mins. each, afterwards going for three short turns alone. The same officer then took up Leading Seaman Brady for 5 mins. Lieut. Smith Barry then taking the same machine over for 20 mins.' flight. Lieut. Smith Barry, by the way, made a very fine ascent during the previous week on the Short Tractor 413, and climbed up to a height of 7,000 ft., finishing up with a very fine spiral descent. The small Henry Farman 412 was taken out by Lieut. Shepherd, R.N., who made two trips of 14 and 8 mins. each. Lieut. Lushington then took the machine over for a trip of about 12 mins. duration, Lieut. Waldron afterwards making a short trip of 8 mins. During the day this machine had a bad landing, with the result that the planes were smashed. The Short Tractor 413 was out several times during the day, Major Gerrard taking it up for about 20 mins., followed by Lieut. Smith Barry, who executed some very neat spirals. Capt. Risk then took the machine over, and after making two flights of about 15 mins. each, took up Pte. Ellison as passenger for about 12 mins. Lieut. Hubbard then went with Stoker Edwards on the same machine. Unfortunately, the machine came down at a very steep angle of descent, and was badly smashed up.

Wednesday, and the remainder of the week, was anything but favourable for flying, strong southerly winds and heavy rain putting it out of the question entirely.

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ROYAL FLYING CORPS.

THE following appointment was announced in the *London Gazette* of the 7th inst. :—

Royal Flying Corps. Military Wing.—Capt. John H. W. Becke, the Sherwood Foresters (Nottinghamshire and Derbyshire Regiment), to be a Flight Commander, and to be seconded. Dated October 28th, 1912.

The following appointments were announced by the Admiralty on the 7th inst. :—

Royal Flying Corps. Naval Wing.—Capt. C. E. Risk (R.M.L.I.), to the "Actæon," for Naval Wing of Royal Flying Corps. Dated December 6th, 1912.

Lieuts. G. V. Wildman-Lushington (R.M.A.) and I. T. Courtney (R.M.L.I.), to the "Actæon," for Naval Wing of Royal Flying Corps. Dated December 6th, 1912.

The following were announced by the Admiralty on the 9th inst. :—

Royal Flying Corps. Naval Wing.—Lieut. R. Fitzmaurice, to the "Actæon," additional, as Squadron Commander Royal Flying Corps, for W.T. duties. Dated December 4th, 1912.

Paymaster E. R. Berne, to the "Actæon," additional, as Flying Officer. Dated November 23rd, 1912.

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Plymouth to Farnborough by Aeroplane.

ON Friday of last week, Capt. Becke and Lieut. Herbert were able to fly back from Plymouth to Farnborough on their Army biplane. They kept mainly at a height of 2,000 metres, and with two descents *en route* completed their journey in 2 hours 40 mins.

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French and German Airships for British Navy.

CONFIRMING rumours which have been abroad for some time, Mr. Winston Churchill on Tuesday night in the House of Commons stated that the British Admiralty had on order with the Astra Company at Paris an airship of the type designed by the Spanish engineer Torres Quevedo as well as one from the Parseval firm. Details are lacking as to the former which, however, should be ready shortly, but it is said that the envelope of the Parseval airship is 300 ft. long with a capacity of about 350,000 cubic feet and driven by two motors of 200-h.p. each. It is also said that she will carry a crew of twenty, and sufficient supplies for a voyage of 24 hours.

Out of Control in Mid-air.

We are anxious to obtain further information relating to the actual experiences of those pilots who have been so unfortunate as temporarily to lose control in mid-air, and the Editor would esteem it a favour if they would communicate with him on the subject. Particulars thus obtained will not be published without permission, but we are very anxious to collect as much reliable data as possible at first hand, and anyone who can contribute a personal experience of an abnormal character in mid-air will serve a really useful purpose.

More particularly we desire information relating to cases similar to Parke's dive, in which machines have not immediately responded to the controls, but other peculiar circumstances not apparently related to the *vol piqué* may nevertheless throw light upon the subject. Letters should be addressed to the Editor and marked "private" on the paper as well as on the envelope.

FOREIGN AVIATION NEWS.

An International Trophy for Hydro-Aeroplanes.

AT the Gordon-Bennett banquet of the Aero Club of France, on the 5th inst., the announcement was made of a splendid offer by M. J. Schneider of a prize for hydro-aeroplanes. Briefly, M. Schneider has offered for international competition a trophy of the value of £1,000, to go to the club which the winning pilot represents; and in connection with this, he also offers to give £1,000 annually for three consecutive years.

First Penalties Under Parisian Regulations.

THE first penalties under the Regulations of the Paris Police forbidding flying over Paris have been inflicted upon MM. Chemet and Borel, each of whom have been fined the nominal sum of one franc each. Chemet's offences were that on November 1st and 5th he flew his Borel hydro-aeroplane over Paris and alighted on the Seine near the Paris Aero Show. M. Borel was summoned as being the constructor of the machine.

Celebrating the G.-B. Victories.

BY way of celebrating the French victories in the Gordon-Bennett aviation and balloon contests this year, a banquet was given by the Aero Club of France at the Palais d'Orsay, on the 5th inst., being presided over by M. Dupuy, Minister of Public Works. Subsequently M. Dupuy presented gold medals of the Aero Club to General Roques, MM. Deperdussin, Bienaime, Garros, and Rene Gasnier. Silver-gilt medals were presented to Vedrines, Prevost, and Rumpelmayer, and a silver medal to M. Jourdan. Commemorative medals were also presented to M. E. Dubonnet (for Gordon-Bennett Balloon Race), M. J. Schneider (Gordon-Bennett Aviation Race), and MM. Blériot, P. Gasnier, and J. Bessoneau (for Grand Prix d'Anjou). After the distribution of these medals, Count de la Vaulx announced the offer by Mr. J. Schneider of a new prize for hydro-aeroplanes, to which we refer elsewhere.

Testing the Blériot Canard.

ON Monday, M. Blériot was at Buc personally superintending the tests of his new Canard machine. In rising from the ground, climbing, descending and landing, the machine proved to be very good, and some turnings were made in the air with the machine very steeply banked. During some of the tests M. Blériot occupied the passenger's seat besides Perreyon, who was the pilot.

Simon a Superior Pilot.

FOR the second qualifying test for his military brevet, Rene Simon on Monday last started for Havre on his 50-h.p. Gnome-Sommer monoplane, and flew over to Paris-Plage, covering the 200 kiloms. in an hour and twenty minutes, and maintaining an average height of about 200 metres.

Fine Work at Caudron School.

AT Crotoy, on the 4th inst., Lieut. Peralda made a flight of an hour and an half, while Lieut. Gerard, accompanied by a Sapper, on a 70-h.p. Caudron and Sapper Delocke, on a 50-h.p. machine, made a reconnaissance along the coast, and landed at Berck, after visiting Fort Mahon. Lieut. Gerard afterwards took a fellow officer for a long trip over Somme Bay.

Height Record Beaten in Tunis.

AFTER climbing to a height of 4,000 metres, on Sunday, in an attempt to beat the height record, Garros found that the oxygen apparatus which he uses to facilitate breathing at high altitudes, was not working properly, and he decided, therefore, to come down. Two days previously, by way of practice, he had flown at a height of 2,000 metres on his Morane monoplane.

Success was attained on Wednesday, when Garros got up to 5,801 metres (19,000 ft.), thus beating Legagneux's record, also on a Morane, of 5,720 metres (18,750 ft.).

Paulhan-Curtiss Machines for Italy.

THE Italian Government having ordered four Paulhan-Curtiss hydro-aeroplanes for the new station at Venice, Paulhan has gone to the "Queen of the Adriatic" to superintend the erection of the machines and see them put through their preliminary trials.

Another M. Farman Superior Pilot.

ON December 4th, Sergeant Dubois, on a Maurice Farman biplane, made the first of his qualifying tests for a superior *brevet* over a course from Buc to Orleans, Chartres, and back.

Good Work in the Snow.

ALTHOUGH last week the eastern part of France was under snow, it did not put an end to active work by the military aviators. On the 5th inst., Lieut. Sylvestre, on his Blériot monoplane, went from Belfort to Epinal, passing over the Vosges Mountains, covering the distance of 80 kiloms. in 50 mins.

Lengthy Flights by Guillaux.

ON his Clement-Bayard monoplane, Guillaux intends to go for the height record shortly, and by way of practice made a flight of an hour's duration at Issy on the 5th inst. He did not, however, go higher than 1,500 metres, from which altitude he eventually landed by a spiral *vol plané*. He was at the same height on the following day for an hour and a half and paid a visit to Levallois, passing over Paris at a height of 1,900 metres.

Good Work on Farmans.

AT Buc, on the 4th inst., Sergt. Carrus was up for an hour and a half at 800 metres on his Farman machine, while at Etampes, on the same date, Paret was flying for over an hour around the country.

Another Borel Superior Pilot.

BY way of qualifiying for his military *brevet*, Segt. Pinsard, on the 4th inst., flew on his Borel from Buc to Chartres and Chateaudun and back, his average altitude being about 1,000 metres.

A Farman Round Eiffel Tower.

ON Sunday, Bernard on a Maurice Farman biplane, fitted with a Canton-Unné motor, started from Buc, and flying over Paris, circled above the Eiffel Tower.

The Blériot Children in the Air.

AT Buc, on Monday, the children of M. Blériot were given a special treat, being allowed to go up with Perreyon, the Chief Pilot at the Blériot school, for a short trip.

High Flying with Low Power.

LAST week at Villacoublay, Sergeant St. Andre made several more high flights on his Nieuport machine, which has only a 2-cyl. Nieuport engine. In one test he climbed to 3,600 metres.

Flight "Man-Birds."—IX.

—From the original by Frank M. Williamson.

THE LAUGHING JACKASS.

Edited by V. E. JOHNSON, M.A.

What Constitutes a Model.

As we expected, exception has been taken to some of our remarks *re* the Model Section at Olympia, and we have been accused of advocating the exhibiting of "freak" models. The question which naturally arises is what constitutes a model? A model is either a copy (on a small scale) of a full-sized machine already in existence or a design for a full-sized machine (in a model form) which has not yet actually been built.

If we accept this definition of a model, and scientifically-speaking it is the correct one, we at once see that many of the machines flown by more than one club, whatever they may be are not "models" at all.

They have, of course, their uses, and form a necessary stepping-stone to more perfect types. A model should resemble a full-sized aeroplane as regards dimensions as near as circumstances permit, due allowance being made for the use of rubber as the motive power. So far as the real question of freak models is concerned it is certainly not the model which makes 30 secs. to 40 secs. duration which constitutes the freak.

Club Exhibits at Olympia.

With a view to encouraging the club movement, it has been arranged that any club desiring to exhibit *as a club* should have its own stand with the name of the club placed prominently over it, and also the privilege of exhibiting up to eight models for half the usual rate. We trust that a good number of the provincial as well as the London clubs will avail themselves of this opportunity. Nearly all clubs have, we know, their local exhibitions, and very good some of them are. Such, however, can only have a more or less purely local interest. At Olympia the interest is not local or even national, but international, and it is to be hoped that the clubs will regard it from this point of view, and be prepared, even possibly at some individual inconvenience, to become exhibitors as a club and not merely exhibit several models as possible competitors.

They could certainly desire no better opportunity to show to the world at large their value as a unit in the realm of aviation.

C. C. Horner's Biplane.

We also publish this week some drawings and sketches of certain details of the above machine, one of the special features of which is the combined elevator and steering plane attached to the extremities of the main upper plane. Such a device as this naturally comes under Class 4 of the Model Section at Olympia, that is a device which could be applied to full sized machines. Mr. Horner states that the idea was taken from the method by which the natives of the South Sea Islands maintain stability in their canoes by having a flat surface extended at the end of bamboo poles on either side of their canoes. The model, we are told, is extremely sensitive, as the shape of the balancing planes is rather long, and they are situated a good way from the centre of the main plane; they, of course, exert a considerable leverage. Mr. Horner considers their shape is the chief characteristic.

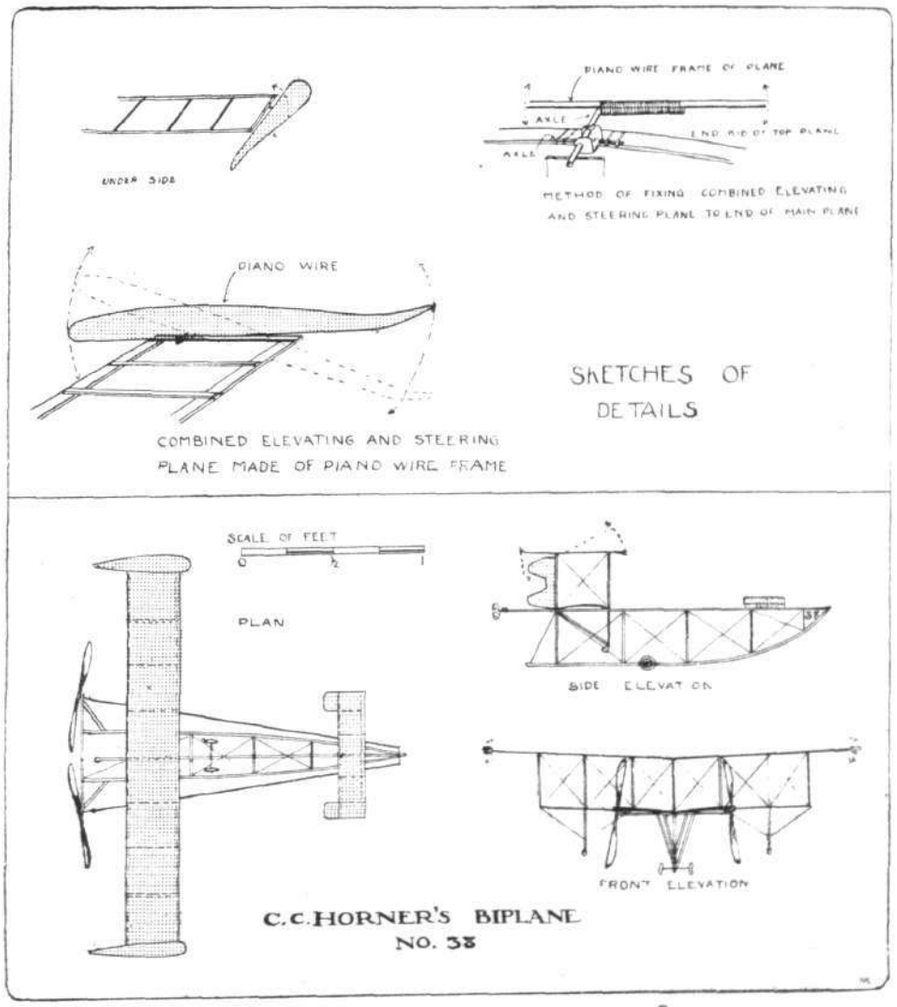
A Standardised Model.

Referring to Mr. B. Lewis' scheme, published some time ago (October 26th issue) in these columns, Mr. J. W. Burghope (Hon. Sec. Reigate, Redhill and District Aero Club) writes:—I have canvassed our members. Nobody wants to carry out the idea, although some of them think it "jolly good." The general opinion is that, although many of us can design our machines to do practically what we want them to, we are so much in love with our own pet ideas, that to have to break away from them and all build to one type would be a sheer waste of time. And what committee is competent to say that such a type of *fuselage* is best and must therefore be perfected? As it is we are all building tractor models of many different types and all our discoveries are "pooled." It is far better to encourage individualism, for if everybody stops work to perfect say a square *fuselage*—well, two fellows could do it as well as the whole club and the others could be going on their own lines. There is no *one* plane, camber, no *one* type of *fuselage*, propeller or chassis, which is best and therefore worthy of standardisation. Every model *must* have its own special detail, design, and to produce highly efficient models there is nothing like discussions as often as possible.

Most of us would *not* fly a standardised model. Where would the competition come in? The only way to get efficient models is to allow full freedom and latitude to design. That tractors should be encouraged. I fully agree, if the tractor model had had one-half the work put into it that the loaded elevator type has had, it would be a far more pefected type than it is now.

Mr. J. Robinson's Scheme.

Mr. J. Robinson (Hon. Sec. Folkestone Model Aero Club) has written as follows:—No doubt some will say that I disagree with Mr. Lewis's idea because I wish to see my alternative idea put in its place, but I will leave it to your readers to decide which is the better scheme. I understand that Mr. Lewis's scheme is to standardise a model, but surely the time is not yet come when it is advisable to do this. Would it not be far more useful to test the relative efficiency of several types of models in the following manner:—Let each club taking part be represented by three machines for each test, and have three tests, viz.,



duration, distance, and speed over (say) 100 yards. Each club to furnish drawings and particulars as to weight, pitch of screws, number of strands of rubber, &c. (or type of motor if a rubber one be not used), and an important factor—the conditions of the air, when the test was carried out be noted. The times, distances, to be signed by two witnesses, not competing.

These tests would give interesting data as to type (loaded elevator, &c.) and efficiency of planes, propellers (if number of turns be stated slip percentage can be obtained) and of the most efficient type of machine in general. R.o.g. models should double all results and single propeller machines add, say, ·25 of the results. The foregoing is, of course, only a sort of summary of the scheme, and model club members would no doubt be able to add to the details.

Mr. B. Dennis (Hampstead) writes:—The scheme of standardising a model is just what is wanted. If all the best results were brought together and a reliable model established, I think it would be the means of reviving the enthusiasm of many a model maker who is sick of repeated failures.

The South-Eastern Model Aero Club.

Mr. A. B. Clark, writing to thank us for the notice inserted in last week's issue, says that as a result they have already got together a good number of supporters, viz, about 30—which, amongst other things, is a proof of the value of FLIGHT as an advertising medium. Mr. Clark thinks there are still others in the Bromley (Kent) and Beckenham district who might like to join, there being especial facilities in those neighbourhoods in the way of good open spaces, and suitable sheets of water.

Some Points About a Model Workshop.

By H. SIBLEY.

A decided advantage about model aeroplane building is that the tools required are neither expensive nor many. A small vice, a fret-saw, a chisel, a small plane, a hand drill, a soldering-iron, hammer, pair of cutting pliers, and last but not least a small pair of scales, being all that is practically necessary, besides which there is great scope for the inventive faculty, and up to the present there is no hard and fast rule as how to do this or that; it is left to each aeromodellist to work out his own ideas.

This is, to my mind, one of the failings of model clubs: that is the incentive to copy the member's model that performs the best. How often you find that in one club one type predominates, and in another some other. The first necessity in a model workshop is tidiness; there is no excuse for an untidy heap of rubbish, tools, &c., scattered in all directions, model parts lying about the floor, aeronautically speaking, *a bois cassé*. It is a good plan to hang up model parts on the walls, as this will make the walls of the workshop useful, and it will tend to keep the floor from becoming a general rubbish heap. I wonder how many models have finished their career through being accidentally trodden on. I must confess in my early flying days many of my own models suffered in this way.

I now keep my propellers (neatly arranged) on one part of the wall, planes on another part, *fuselages* on yet another part; if any reader has not tried this method, he does not know how well it improves his workshop.

The workshop should also have its designing department. Personally, I derive much pleasure in always making plans and sketches of every model turned out, and I think that is why so many models are badly constructed; it is due, in the first place, to lack of thought being given to designing and thinking out each part separately. Some of my fellow modellists spend hours in explaining how such and such a thing is going to be made, when a well drawn plan and a few sketches would show up certain errors, which without such would not have been apparent until much time and labour had been lost.

Plans are also very handy for future reference besides giving one some idea of the work accomplished.

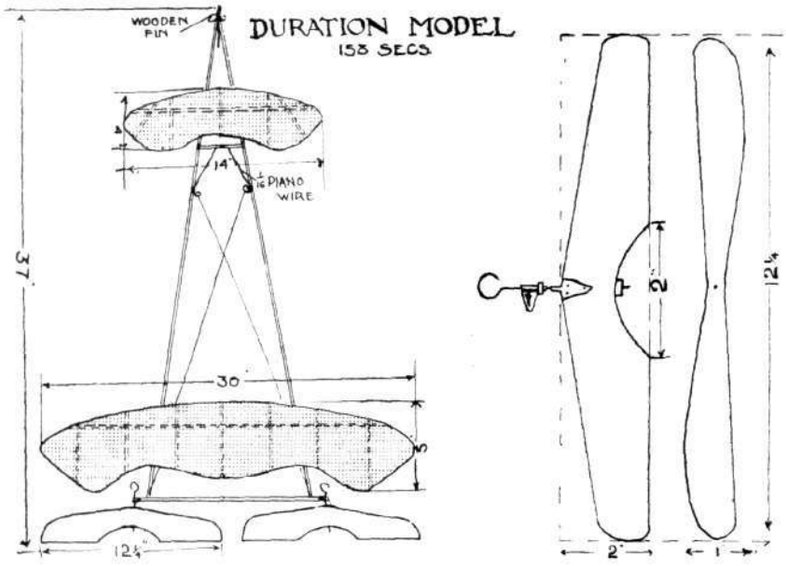
It is advisable to always have a good supply of materials, for it is very irritating, just as you are getting on with the model, to find you lack this or that which for the time being puts an end to your work.

It is almost needless to say, always have the best materials that is within reach of your pocket. In this direction it is surprising how many things can be adopted for models from household oddments.

Never scamp the smallest part of your work; the old saying, "The more you put into a thing, the more you will get out of it," applies probably more to the making of model aeroplanes than to anything else

Model Flying in America.

We give this week scale drawings and a brief account of Mr. Armour Selley's model—which is stated to have made a duration of 158 secs. at the Oakwood Heights Aviation Park last October. The chief particulars are: Length of *fuselage*, 37 ins.; main plane, 30 ins. by 5 ins.; elevating plane, 14 ins by 4 ins. Both planes are covered with silk, and entirely made of bamboo; twin propellers, 12¼ ins. diam., 36 ins. pitch; speed, 450 r.p.m.;



motive power, 14 strands of ⅛ in. flat rubber; weight of model, 5¼ ozs.

The Model Aero Club of Summit held a contest on October 20th last, in which there were contests for duration (hand-launched), distance (hand-launched), duration (r.o.g.), and distance (r.o.g.). The secretary of the club, Mr. G. F. Forster, sends us the following results: Distance (hand-launched), 1st, W. Lauder, 1,153 ft.: 2nd, A Selley, 1,027 ft. Duration (hand-launched), 1st, W. Lauder, 143 secs.; 2nd, A. Selley, 127 secs. Distance (r.o.g.), 1st, G. A. Page, jr., 953 ft.; 2nd, F. Schultz, 720 ft. Duration (r.o.g.), 1st, C. Myers, 73⅛ secs.; 2nd, A. Selley, 65 secs.

The details of Mr. Lauder's machine are:—Length of *fuselage*, 40 ins.; width at rear, 12 ins.; rear wing, 27 ins. by 7 ins.; forward wing, 12 ins. by 5 ins.; propellers (two), 12 in. The spines are oval in cross section and taper from ¼ in. the centre to ⅛ in. at the forward end, and $\frac{5}{16}$ in. at the rear end. The tip-angle of the propellers is 44°. The power consists of 14 strands of ⅛ in. flat rubber. The weight of the model, including the rubber motors is 4¾ ozs. "Rubberine" was used to lubricate the rubber.

The club has not made many hydro-aeroplanes, but expects to next spring. The records of the club are as follows:—

Hand-launched: Distance, Carter Tiffany, 1,964 ft.; duration, W. Lauder, 143 secs.

Off the Ground: Distance, C. Myers, 703 ft.; duration, C. Myers, 73⅛ secs.

Hydro-aeroplane off water—W. Lauder, 18 secs.

Single propeller tractor model—Hardee Johnson, 259 ft.

At the present time there are few, if any, models of the single-stick type in use in America, where model aviators all seem to believe in the triangular *fuselage*.

Commenting on Mr. Forster's interesting communication and the apparently remarkable series of records which it exhibits, we desire to know more about the nature of the ground at or on which these startling records were made. Whether it was (as at Greenford or other model flying grounds round London) a, practically speaking, perfectly level ground or the top of a hill? Such terms as Oakwood "Heights," "Summit" Model Aero Club, certainly suggest such, as also do the results. Presuming this to be the case, it only remains for some English aeromodellist to go up to the top of the Blackpool Tower (about 500 ft.) and launch one of our best duration "flyers" from it to set up another "*world's record*." Unless we know full particulars—*including the nature of the ground on which such records are made*—we must respectfully decline to publish such in future, as the whole thing becomes in our opinion a mere farce. In the English distance official records deduction is also made for wind velocity. If the American records were made on flat ground then we must indeed congratulate them on the results.

MODEL CLUB DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Hendon Model Aero Club (20, AUDLEY ROAD, W. HENDON).
ALL-ROUND trophy postponed until Boxing Day meeting, when it will be competed for to decide winner permanently. Flying as usual. R.o.g. tests.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).
DECEMBER 14TH. Flying, at 3 p.m., opposite brickfields. December 15th, at 10 a.m., near Bushwood Avenues.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).
DECEMBER 28TH. Lecture on "Hydro-Aeroplanes," by V. E. Johnson, M.A., at St. Andrew's Hall, Ealing Road, Wembley. Illustrated by lantern slides. Time to commence will be announced later. Admission, 6*d*; reserved seats, 1*s*. Applications for tickets should be made early, as accommodation is limited.

Scottish Ae.S. ("ROCHELLE," LIMESIDE AVENUE, RUTHERGLEN).
DECEMBER 14TH. Hydro-aeroplane demonstration, Maxwell Park. December 21st. Monthly competition at Paisley Racecourse. December 28th. No official meeting, owing to holidays.

Sheffield Model Aero Club (35, PENRHYN ROAD, SHEFFIELD).
No further weekly competition until after next general meeting. All members are requested to see FLIGHT, December 21st, for particulars of competition on Christmas Day for Mr. Manton's silver aviation medal. Tractor biplanes. Longest flight, hand-launched.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).
DECEMBER 14TH, at Kidbrooke, 2.30 p.m. to 4 p.m. December 15th, at Blackheath, 8 a.m. to 10 a.m.; Woolwich Common, 10.15 a.m. to 12.30 p.m. December 19th, at Blackheath, 7.30 p.m., illuminated flying.

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Hand-launched	Distance	A. E. Woollard	477 yards.
	Duration	A. F. Houlberg	89 secs.
Off ground	Distance	G. Rowlands	232 yards.
	Duration	A. F. Houlberg	51 secs.
Hydro, off water	Duration	G. P. Bragg-Smith	25 secs.
Single-tractor screw, hand-launched	Distance	H. R. Weston	84 yards.
	Duration	F. W. Jannaway	22 secs.

Official Trials.—To-day, Saturday, December 14th, on the ground of the Aero Models Association (Northern Branch), Finchley, at 3 o'clock.

Aero Show, Olympia.—Already several clubs have written, reserving club stands. Will any club wishing to have a stand send in at once to the hon. sec., asking that one shall be reserved for them, as the space is limited.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

CORRESPONDENCE.

*** *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letters intended for insertion, or containing queries.*

Correspondents communicating with regard to letters which have appeared in FLIGHT, would much facilitate ready reference by quoting the number of each letter.

Eiffel's Experiments.

[1690] In several recent issues of your excellent journal I note many of your correspondents venture to dissent—in part at least—from some of the conclusions arrived at by the Eiffel Laboratory experimenters as to "negative wing pressures." While I do not feel justified in going into the matter of wing pressures, I believe my observations on the matter of the Eiffel tests for fuselage forms may be of some interest to your readers.

To begin with, the true stream-line forms of nature, as expressed in the bodies of birds, fishes, &c., have the clearly-defined nature that in the rear portions of the forms the first part of the longitudinal lines are convex in nature, later becoming concave for the remainder of their length, and in the case of "torpille" forms, the lines of the front portion are concave at the point, changing to convex as the apex is approached. In none of the Eiffel forms do any concave lines appear; their lines seem to be either convex or approximately straight lines. Then these wind-tunnel experiments do not seem altogether satisfactory, for they do not take into consideration the influence of the propellers. For instance, were the propeller at the rear it would have the effect of drawing away from the body the displaced air-currents, so that they would not successfully snap together around the rear portion of the form, and thus they would fail to give the "reaction impulse," which is, of course, infinitely the most important value obtaining from the use of "stream-line" forms. On the other hand, were the propeller in front, the speed of the slip-streams striking against the portions of projected area nearest the circumference would be much greater than that of those striking towards the centre. In other words the slip-streams would actually strike with greatest force just where the Eiffel pressure distribution charts show the pressures to be most negative! And *vice versa*.

Small fuselage models could be freely but accurately suspended, and stayed horizontally some distance above the ground by suitable guy and bracing wires from both tail and apex, and these models fitted with propellers of proportionate size, and engined with motor cycle engines of such power, and geared in such manner as to produce slip-streams of such speed as would obtain with the proposed full-sized machine; then let the engines be started, and at the same time have an air-current from a powerful blower strike the model squarely in front at a speed equal to the designed speed of the proposed full-sized finished aeroplane. There would be a testing apparatus some distance away connected with the end of model's tail. The form would be efficient to the same degree as the previously determined propeller thrust was found expressed in the "draw-bar pull" registered by the testing apparatus just mentioned. This test being performed in the open, there could be no compression where the air-current passed around model; for in wind-tunnel experiments there is bound to be more or less compression, according to the diameters of tunnel and model. While the test I suggest would be expensive, it would not be prohibitively so, and it would seem that such a test would be the only one at all nearly identical with the conditions in actual practice.

If the wind-tunnel method must be used, by all means it should not be placed horizontally. It should be in a vertical position, and the air-current should flow downward, so that "draw-bar pull" might be accurately determined (weight of model, of course, being deducted). The perforation system would be used only in estimating distribution of pressures.

351, Well Street, Chicago. J. B. MCQUEENY.

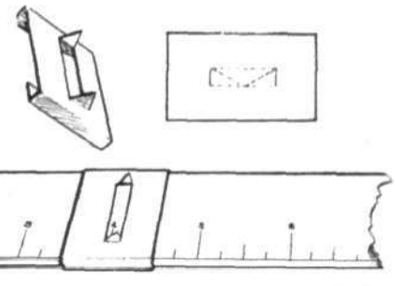
Measuring Altitude.

[1691] The following idea may be of interest to some of your readers:—

It is commonly known that the barograph is the most accurate instrument for measuring the height of a flying machine, but so long as the machine can be distinctly observed, a person on the ground at the time the aviator passes over him, can make a fairly accurate measurement of his altitude with the simple instrument here described:—

Take a common yard stick and make a slide of sheet tin to fit over it, as is shown in the illustration. The slide should fit snugly enough so that it will remain in any position in which it is set, until a reading of the scale can be made. The slide is made by cutting out a slot at the centre of a strip of tin in such a way as to form two points, which, when bent at right angle with the strip, will be just one inch apart. The pattern in the upper left-hand corner of the illustration shows the way the tin strip should be cut to form these points.

This operation is best performed with a chisel cutting upon the dotted lines, and bending upward upon the solid lines. After forming the points accurately, bend the strip around the yard stick in the form shown in the lower right hand corner of the sketch, and fit it over the stick so that the figures upon the scale can be read through the slot in the centre. To ascertain the height of an aeroplane, its length must be known. Lying upon your back upon the ground you place the end of the stick to your eye



and set the slide so that the aeroplane can be just sighted lengthwise between the two points. Supposing the slide to stand at 14, multiply the length of the machine by 14, and the product will be the height in feet. For the standard Wright machine, allow 40 ft.; for the baby Wright machine, allow 20 ft.; for the Curtiss machine, allow 30 ft.; and for the majority of monoplanes, 30 ft. Thus, suppose the standard Wright machine is flying above you; if, after sighting, the slide stands at 15, multiply 40 by 15, and the product, 600, will be the height in feet at which the aeroplane is flying. This system was first used by the Wright Brothers at their testing grounds near Dayton, Ohio. The device is one that will give considerable amusement and instruction to both old and young.

3, Walsingham Road, Hove. C. H. F. WIEDMANN.

Accidents.

[1692] *Re* Mr. Gaunt's letter (1660), the Southport airman asks for certain information regarding some fatalities.

In the case of Oxley, there was practically no wind at all; he had a habit of landing by means of a dive from a considerable height with engine on, then flattening out when near the ground. On this occasion he commenced his dive from an altitude of 600 ft., and, when only 50 ft. from the ground, flattened her out. The machine (a 60-h.p. Renault-Blackburn) had actually commenced to flatten out, when, owing to the enormous strain she was subjected to, the fabric on the under side of the wings burst, the pressure inside then ripped them to bits.

I am rather surprised that no one has forwarded particulars relating to some of the other cases, especially that of the late Mr. Fenwick.

Finally, I should like to add that I never see any reports of Mr. Gaunt's performances. Now during this last summer I have seen dozens of really good flights at altitudes anything up to 200 ft. His machine is a 30-h.p. tractor biplane of very small dimensions of his own design and construction. It is nothing unusual to see this little machine take off like a Gnome, whereas the engine is an Alvaston. I cannot help writing these few remarks as Mr. Gaunt has done much to stimulate aviation in Southport and district. Wishing your paper every success,

Leeds. ALBERT E. D. BENNETT.

Turning in Flight.

[1693] I had the following query mentioned to me regarding old Farman biplanes, which some of your readers may be able to answer. It is this: Why do the old type of Farman aeroplane tend to *fall* while making a left-hand turn, and to rise while making a right-hand turn?

W. Dulwich. E. METCALF.

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AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

Loan Exhibition, Science Museum, 1912-13.—A temporary collection illustrating the development of aeronautics is now being got together at the Science Museum. The Exhibition will last about six weeks in December and January. The Society is contributing many portraits and prints, Stringfellow's model aeroplane and light-weight steam engine, the Pilcher glider from which Pilcher met his death, and a Lilienthal glider.

Members possessing relics of early pioneers are requested to communicate with the Secretary at 11, Adam Street, Adelphi, W.C.

BERTRAM G. COOPER, Secretary.

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The Sheerness Mystery Airship.

MR. CURT ABEL-MUSGRAVE writes from Brighton, under date of December 5th, as follows:—

"In consideration of Anglo German relations it seems to me very desirable to penetrate the mystery of the reported appearance of an airship over Sheerness and other places on the English coast in October last. Count Zeppelin has already denied that any of his vessels have ever crossed the Channel and passed over England. His statement is confirmed and greatly enlarged by a letter which I have received to-day from the well-known German expert Hauptmann Dr. A. Hildebrandt, formerly commander of the Prussian Army Air Corps (Luft Bataillon), and at present one of the principal instructors to the German Army. Captain Hildebrandt has written to me that the reported airship cannot have been a German one because none of the vessels of the Zeppelin type have travelled in the direction towards England, and vessels of any other type have, up to the present moment, never even attempted to cross over the sea. This statement, coming from an absolutely reliable source, in intimate touch with the highest German authorities, ought to dispose of the rumours, once for all, that any German vessel can be held responsible for the reported incident."

Specialists in Aviation.

THIS is the claim made by Messrs. Aeros, Ltd., of 39, St. James's Street, S.W., who lay themselves out to cater for everything connected with aviation, whether it concerns the booking of passenger flights, learning to fly, accessories for machines or motors, or spare parts for either, or tickets for aviation meeting, lectures, &c. They also have a special bureau for giving sound information generally on aviation matters.

London Aerodrome.

DURING the week there have been a good many exhibition flights made at the London Aerodrome. On Tuesday, Mr. Manton was flying; Thursday afternoon, Mr. Gates and Mr. Manton were doing fine circuits, while Mr. Noel was to be seen taking up passengers, and Mr. Desoutter doing good work on his Blériot monoplane.

On Friday afternoon, as Mr. Manio was expected to arrive at Hendon but failed to appear, Mr. Louis Noel started out on the 80-h.p. Farman to meet him, but after a good flight around was compelled to return disappointed, as in the meantime, the light had quite gone.

The Breguet aeroplane pilots were also very busy during the week.

Contests at Brooklands.

AN Altitude Competition has been arranged for to-day (Saturday), in which the following will compete:—Mr. Barnwell (Vickers monoplane), Mr. Hawker (Sopwith biplane), Mr. Knight (Vickers-Farman biplane), Mr. Merriam (Bristol biplane).

There will be a quick-starting and alighting competition on Sunday, in which the following well-known aviators will compete:—Mr. Barnwell (Vickers monoplane), Mr. Merriam (Bristol biplane), Mr. Bendall (Bristol biplane), Mr. Hawker (Sopwith biplane), Mr. Spencer (Spencer biplane), Mr. Pashley (Sommer biplane), Mr. Alcock (Farman-biplane), Mr. Knight (Vickers-Farman biplane).

Mr. Hucks at Birmingham.

AT the Castle Bromwich Grounds, on Saturday last, Mr. B. C. Hucks again entertained a great crowd by two very fine exhibition flights, the second one being completed in the dusk. There was a very strong wind blowing at the time, and Mr. Hucks went so high that on several occasions he disappeared amongst the clouds.

Mr. Hamel at Market Harborough.

ON Thursday of last week, Mr. Gustav Hamel paid a visit to Market Harborough and greatly delighted a large crowd of spectators by three very good flights on his Blériot monoplane.

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IMPORTS AND EXPORTS, 1911-12.

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910):—

	Imports.		Exports.		Re-Exportation.	
	1911.	1912.	1911.	1912.	1911.	1912.
	£	£	£	£	£	£
January ...	1,196	619	1,088	2,412	Nil	Nil
February	3,129	3,110	1,786	36	Nil	Nil
March ...	11,327	640	1,027	950	357	600
April ...	2,110	4,820	807	72	4,343	50
May ...	1,707	7,494	2,471	1,350	1,972	154
June ...	3,225	7,928	2,432	419	1,682	300
July ...	9,822	13,794	2,256	5,376	643	967
August ...	2,873	8,559	2,153	1,342	265	2,040
September	1,839	6,575	1,183	2,885	—	1,626
October ...	4,727	6,836	701	3,128	400	695
November	1,785	8,455	1,440	2,002	360	405
11 months	43,740	68,830	17,344	19,972	10,022	6,837

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Aeronautical Patents Published.

Applied for in 1912.

Published December 12th, 1912.

15,754. W. J. WILSON. Airships, aeroplanes, &c.
18,171. A. VON KEISSLER. Flying machines.

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